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ABSTRACT

This thesis reviews infant learning literature, describes infant education programs, and discusses Piaget's theory of development. Also presented is a curriculum model which is Piagetian in perspective and includes: (1) information on some psychological foundations of infant education; (2) a planning component explaining appropriate settings, goals, influences on the model, and design rationale; (3) a statement of the aspects of development to be facilitated by teachers in employing a model; and (4) an evaluation section in which means of assessing the effectiveness of the curriculum are discussed. (SDH)

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A PROPOSAL FOR A RESEARCH AND DEVELOPMENT PROGRAM IN INFANT LEARNING AND DEVELOPMENT

BY

RHONDA CLAPPER ROMERO

A thesis submitted in partial fulfillment of the
requirements for the degree of

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Table of Contents

Statement of the Problem 1

Chapter 1: A Selective Review of the Infant Learning Literature 3

Chapter 2: Infant Education Program Types 7

Infant Education as a Prevention Technique 7

Infant Education as a Remediation Technique 11

Infant Education as an Enhancement Technique 15

Discussion 15

Chapter 3: A Research Model/Piagetian Theory 21

Chapter 4: A Proposed Piagetian Curriculum Model 29

Psychological Foundations 30

Planning Component 32

Scope and Sequence 36

Evaluation 42

Chapter 5: Implementation and Conclusions 43

Appendix A: Review of Infant Education Programs 62

Section I: Programs with the General Goal of Preventing Disadvantages Associated with Environmental Deprivation 62

Section II: Programs with the General Goal of Remediating Diagnosed Disadvantages.. 82

Section III: A Program with the General Goal of Maintaining Normal Development in the Day Care Setting 90

Section IV: A Program with the General Goal of Enhancing the Development of Normal Infants 92

00003

Table of Contents, con't.

Appendix B: Outlines of Piaget's Work in Sensorimotor Development 94

Section I: Observations and Experiments by Stage 94

Section II: Outline of the Sensorimotor Period 102

Section III: The Development of Imitation 109

Section IV: The Development of Play 111

Appendix C: Sample Curriculum Guide Outline 113

References 119

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As many people have contributed to this work as have touched my life. This thesis dedicates itself to them all, but I dedicate it especially to:

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My parents, LeRoy and Alice Clapper, my first and most devoted teachers.

The members of my examining committee:

Dr. Thomas Yawkey, chairman

Dr. David Burke

Dr. Philip A. Morse

who have understood and refined my work and encouraged me.

And to you, the reader, without whom it is merely an intellectual exercise. I hope that you will catch glimpses of yourself among these pages and smile.

They, then whc knowingly withhold sustenance from a newborn child, and he dies are guilty of infanticide. And, by the same reasoning, they who refuse to enlighten the intellect of a rising generation, are guilty of degrading the human race! They who refuse to train up children in the way they should go, are training up incendiaries and madmen to destroy property and life, and to invade and pollute the sancuaries of society.

Horace Mann, 1846

00006

Statement of the Problem

The juxtaposition of the words infant (referring to a child under two years of age) and education strikes most people as patently absurd. Widespread opinion holds that the young infant has a great deal more in common with vegetables than with human beings, and as a result, tending the infant is often conceptualized as very similar to cultivating a garden--just give it the proper physical care and it will grow into something useful. This misconception is buttressed by the idea that education can mean only the formal system which has been traditionally employed in public schools. The infant is obviously totally unsuited to traditional formal education with its emphasis on following verbal instructions and memorization (one wonders if anyone is really suited to it). However, if education can be more broadly defined as the facilitation of learning, then there is reason to believe that infant education may be quite possible.

It is first incumbent upon the proponent of infant education, the position assumed in this thesis, to demonstrate that infants do learn--and fail to do so--(Chapter 1) and that given certain circumstances this learning can be facilitated (Chapter 2). However, his responsibility does not end here, for infant education is perforce an endeavor which does not seek only to acquire knowledge, but also to employ it--to adjudicate theory and mold it into successful practice which may have profound implications, positive or negative, for society at large. Any such project must be entered with the utmost forethought and planning,

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requiring both a research application model (Chapter 3) and a coordinating mechanism (Chapter 4).

This thesis attempts to address each of these aspects of the topic and achieve some degree of resolution, providing, hopefully, some insights into the nature of infant education which may suggest new directions to those within this emerging field.

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Chapter 1

A Selective Review of the Infant Learning Literature

Benjamin Bloom (1964) has stated that a person's intellectual capacity is well established by the age of four, underlining the importance of cognitive development in infancy. Piaget (1952) has placed the origins of intelligence in the first two years of life, emphasizing the infant's early progress in sensorimotor skills which foster and develop such concepts as causality, time, the ego, and the object. In his theory the child is viewed as an active agent constantly engaged in the business of learning and intrinsically motivated. The developments of this period form the basis of all later cognitive, social, and physical development.

It is of great importance that infants have adequate opportunities to develop the skills basic to this period. During the first 3.5 months of life, stimulation of the various sensory receptor modalities is particularly important (Ginsburg and Opper, 1969). To the age of 9 or 10 months, the child responds to a variety of familiar situations which he can recognize and shows an interest in in which he can act on and prolong or reproduce the interesting phenomena associated with the situation. Up to the age of eighteen months he utilizes opportunities to try out his new motor skills and to observe the effects of variations. Piaget (1952) has carefully delineated the stages of intellectual growth in the infant. Perhaps it is a deficiency at one of these

early stages of intellectual development which underlies the disadvantages of some children. Theory such as that advanced by Piaget can form the basis of infant education programs and is in fact directly implied in those of Gordon (1973) and Lambie et. al. (1974) and indirectly implicated in most others to varying degrees (Horowitz and Paden, 1973).

Perhaps even more impressive is the evidence of the deleterious effects of failure to provide the infant with opportunities to learn. Mason (1970) states that early deprivation in primates results in the breakdown of primordial schemas; inability to direct attention; distortion of schemas; excessive arousal effects; deficiencies in problem solving skills; and the curtailment of higher-order functions. The observations of retardation, apathy, and fearfulness of infants institutionalized in orphanages geared to the physical maintenance of the child have been common since the turn of the century and are supported by current research. Dennis (1960) reports extreme developmental lags in the motor skills in inmates relative to home-raised peers. Gesell and Amatruda (1941) report infants raised in orphanages to show "an exaggerated resistance to new situations." Both of these observations have profound implications for the child's cognitive development given the Piagetian model with the stress it places on the fundamental importance of motor skills and of interest in and adjustment to novelty.

Most people are aware of these early deficits common in orphanage

infants but feel that they are not permanent or do not have permanent effects. However, animal studies have shown that extreme isolation has highly negative and permanent effects--and it is much harder to (perhaps impossible to) rehabilitate the isolated animal than to avoid the problem. Furthermore, Goldfarb (1943a, 1943b, 1943c, 1944) has demonstrated that the effects of an infancy spent in an institution are permanent. In conducting his research, Goldfarb matched fifteen children separated from their mothers at 4 to 6 months of age and reared in an orphanage to 3.5 years of age then placed in foster homes to fifteen such children immediately placed in foster homes. The intelligence quotients (IQ's) of the latter group averaged 23 points higher than those of the institutional groups when measured between the ages of 10 and 14 years (Goldfarb, 1943a). The foster home group also rated much higher on social maturity and frustration tolerance scales (Goldfarb, 1943c). Three times as many instances of problem behavior were observed in the institutional group (Goldfarb, 1943b). Rorschah tests administered at adolescence showed the institutional group to have less imagination (Goldfarb, 1944).

Further evidence of the effects of the early environment on the child's later behavior are evident in the differences between poor and priveleged children. Kagan (1970, p. 10) lists seven major differences between these groups: language--"...the poor child is less able to understand complex sentences and speaks in simpler and shorter phrases..."; mental set--the ability to activate cognitive structures to solve problems or to understand descrepant events is less soplisticated in poor

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children; attachment--the poor child receives less attention from his mother; inhibition--more pronounced in the poor child; motivation--another deficit; and expectancy of failure--high in the poor child. Kagan attributes these differences to early environmental deprivation.

The problem of cultural bias in testing cannot be ignored, though. Had these children been tested on tasks appropriate to their own cultures rather than dominant culture tasks, the poor children might have far outstripped the privileged children. Cole, Gay, and Glick (1971) have demonstrated such a phenomenon in a situation in which "disadvantaged" Kpelle rice farmers proved far more intelligent than standard Americans because they could measure rice infinitely more accurately. Nonetheless, such studies do point out that there are differences between children reared in different social classes and/or cultures which are probably due to differences in early environment and which constitute an awesome disadvantage for the poor child when he clashes with middle class institutions like the school. Recent efforts to develop intervention programs to offset the disadvantages of the poor child have taken many forms; we will now consider the development of programs for infant education.

Chapter 2

Infant Education Program Types

It would probably not be difficult to obtain general agreement among researchers that infants to learn and fail to do so. However, advocates of infant education, while standing on the firm ground of this assertion, extend themselves into more questionable realms, making the assertion that given certain circumstances, this learning can be facilitated and that active intervention to bring infant to some level of functioning is necessary and/or desirable in certain situations. These situations are cultural disadvantage; physical disadvantage; children in group day care; and normal children in normal homes. The rationale for the type of intervention associated with each situation is described in this chapter. Programs reflecting each aspect of infant education are outlined in appendix A.

Infant Education as a Prevention Technique: The Culturally Disadvantaged Infant

The term "disadvantaged" has largely been viewed, and perhaps employed, as a pejorative classification for culturally different children. Such usage seems both ill considered and unfortunate. A disadvantaged child may be defined as one who is less able than are other members of his peer group to cope with the environment in which

he must live. Disadvantages may be biologically as well as environmentally based. The term "disadvantaged" ought not to be a value judgment. To say that the culturally different child is "disadvantaged" relative to traditional school performance when compared to his dominant culture peer is not to say that the culturally different child is a priori inferior. However, it does suggest that he will have a hard time coping with the dominant culture power structure and stands a good chance of being chewed up by it.

It is advantageous to know the traditions and mores of more than one culture. The culturally different child who learns to play the dominant culture game while retaining his own sense of ethnic pride not only ceases to be disadvantaged, but becomes particularly advantaged, while any child who remains locked into his own culture, whatever it is, suffers personally the ill effects of provincalism which have so often been demonstrated on a larger scale (i.e., war, prejudice, etc.). Any one culture child is to some extent disadvantaged. However, given the current social structure, it is the minority culture child who is in immediate and direct danger. One can say that the institutions should be changed, and perhaps someone will devise a method of doing so. One approach is to change the people of the society, which should then be reflected in change in social institutions. Infant education could be one instrument of such change.

Cole and Buner (1972) describe the two approaches most often taken toward the explanation and understanding of "disadvantaged". They argue against the deficit model which says that the disadvantaged child is deficient and implies that he is generally inferior, preferring instead

to term his different (here again, disadvantaged is taken in the restricted sense of culturally different and not in the more broad sense defined earlier). Both positions have certain merits and demerits. The merits lie largely in the objective evaluations of the terms while the demerits reside in the attached value judgments. Culturally different children are different from dominant culture peers and they are relatively deficient in certain skills required by the dominant culture and not their own. However, to suggest that difference is a fortiori good and to be fully embraced and promoted in the absence of any mututal understanding is as illogical as it is nonfunctional. The implication that sameness and conformity are appropriate ultimate goals for mankind is equally extremist and untenable..."it is the nature of things to be destroyed by defect and excess...(virtues) are destroyed by excess and defect, and preserved by the mean (Aristotle, 1968, p. 183)."

As a result of such considerations, a major thrust of early childhood education programs has been compensatory education for the culturally disadvantaged child. A number of programs designed to help the disadvantaged (lower class) child have proven to have limited and transcient effects. Notable among them is Head Start which was and is an admirable attempt, but which has met with innumerable difficulties (Horowitz and Paden, 1973) and has been termed "too little, too late." Perhaps more would help, but it seems somewhat more productive to view the problem as one of point of attack. Burton White (et. al., 1973, p.3) describes the goals of his group's work as "...optimizing human

development rather than removing developmental deficiencies." Such a goal is in some sense intuitively more amenable than its converse. Repeatedly, in diverse situations, in which the origin of a problem was understood (medicine offers the clearest examples--smallpox, polio, etc.), prevention has proven a far more tractable task then remediation. Yet, the social sciences have been largely unable to define the origins of cognitive and social disadvantages, which at face value makes prevention impossible. This fact does not make remediation a more feasible tact, though, for it must cope with the self-same problem. How does one remediate without knowing the cause? Very badly and with a low success rate. Prevention offers another alternative. If we do not know what does cause disadvantages, we at least know something about what does not--that is, about normal development. A logical attack on the problem, then, might be to provide for prevention through the planned facilitation of normal development to the extent that it is understood.

For any attempt at this sort of prevention, programs like Head Start are much too late. Therefore, not surprisingly, many have viewed the prevention of this sort of disadvantage as an appropriate goal for infant education programs. A number of research projects seem to show that this may be a productive method of attacking such problems which seem to be directly related to the type of environment experienced (Caldwell and Richmond, 1965; Gordon, 1973, 1974; Schaeffer, 1970; Heber, et. al., 1972; Karnes, et. al., 1970; Lambie and Weikart, 1974). These programs are described in detail in Section I of appendix A.

Infant Education as a Remediation Technique: The Biologically Disadvantaged Infant

Some disadvantages, as noted earlier, are biologically based. Examples of such disadvantages are central nervous system maldevelopment of prenatal origin; congenital encephalopathy; multiple congenital anomolies with mental retardation; mental and motor retardation of unknown etiology which do not appear to be associated with environmental deprivation and are associated with a history of physical disorders; cerebral palsy; birth injury; spina bifida; infantile autism; and genetic anomalies. These disadvantages can sometimes be diagnosed in early infancy.

Here, then, remediation in infancy may be a reasonable goal. However, given the extreme variations in the characteristics, origins, and severity of these disorders and the frequent difficulty in assessing exact etiology, remediation is, again, a challenging task. The tack of facilitating normal development with special emphasis of the areas of each infant's most severe weaknesses seems promising. This tack can be called remediation since the disadvantage is evident at the onset of intervention.

Characteristically, it has been considered desirable to begin the process of remediation as soon as possible. Taking the Piagetian view of child development, the importance of intervention in infancy is highlighted. Several programs have adopted this premise and provide some interesting information (Barrera, et. al., unpublished, undated;

Bricker and Bricker, 1973, 1974; and Haynes, unpublished, 1974; for program outlines, see appendix A, section II).

Infant Education as a Maintenance Technique: The Normal Infant in Day Care

Another trend which has inspired programs in infant education is the increasing demand for day care. Three factors have led to the creation of new world wide needs for day care for infants: increases in women working; a shift of economically active women from agriculture to industry, commerce, or services; and changes in the status of women (Papousek, 1970). These trends are all very strong in the United States. A survey conducted by Keister's (1965) research group in Guilford County, North Carolina indicated that 26 per cent of all white mothers and 40 per cent of all nonwhite mothers with children under three were gainfully employed outside of the home and that of 682 infants in 501 families, 28 per cent were experiencing some form of supplementary mothering while 16 per cent were out of the home during the day; 54 per cent of these infants were under six months of age when the mother returned to work and 70 per cent were less than a year old. Basically, two types of out of home care are potentially available for these infants; group day care and family day care.

Group day care, under ideal conditions, may in some respects best home care--a well-trained staff can raise the level of educational

care; the presense of other children of similar age may facilitate language and social development; contact between parents and teachers may result in transfer of educational principles to the home; and health care, nutrition, and exercise, as well as play facilities, may be better than in the home (Papousek, 1970). However, the risks are great. The effects of bad institutions on children have already been noted. If day care is widely used, as there is reason to expect that it will be one day, and great care is not taken to see that it does not become a bad institution, the results could be disastrous. Both Keister (1970) and Provence (1967) have expressed this fear. The main potential disadvantages seen by Papousek (1970) are a lack of sufficient staff training resulting in cold, impersonal, routine care; poor emotional contact, neglect of the individual, and support of conformity; the absence of male models; the possibility of over contact with group mates which may produce stress; the spread of disease, particularly those of the upper respiratory tract; a tendancy to cause parental hostility or abdication of parental responsibility; and the detachment of the child from "...everyday contact with the broader environment..." which may slow the development of speech and cognition. In view of these potential problems, advocates of infant education for normal infants in the day care setting must carefully consider their actions, striving always to maintain normal development (for program example, see appendix A, section III).

The Normal Infant in Family Day Care

The same goal may be appropriate for family day care homes in which a woman cares for children in her home. This situation has the some potential problems as group day care although probably to a lesser extent as the setting is naturally home-like and most homes seem to do a fairly good job at child rearing, with even the worst home being superior to the majority of our current institutions, and there are likely to be less children in the family day care home than in the center. However, a major problem which is unique to family day care homes as child care facilities (excluding the home) is that they are not very visible. Although they are usually required by law to be licensed, it seems that most family daycare mothers are not (Sale and Torres, 1971). A group day care center providing little or no opportunity for learning is almost sure to be found out; not so with a poor family day care home. Also, there are no supporting services available to insure the care which may be needed. Family day care needs organization and support to insure the maintenance of normal development in normal children, as a pilot study at Pacific Oaks College shows (Sale and Torres, 1971, see this study as a model for such a program; see also, Dempsey, unpublished, 1973).

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Infant Education as an Enhancement Technique:

The Normal Infant

The public education system has always espoused the goals of uplifting people from stupidity and keeping them from becoming stupid, but perhaps its greatest goal (whether achieved or not) is its positive ambition to make people smarter and better. Infant education can take a cue from this. Prevention, remediation, and maintenance are admirable goals, but they are goals which have ends and may eventually reach a stalemate and self-destruct out of sheer boredom without their complement, progress, which always leaves something new to prevent, remediate, or maintain, completing the cycle. However, since it is not (yet) linked to the educational system, infant education may purify the progress goal aiming not to make infants better (which the system reserves the right to define), but rather to allow them to develop more fully. At least one program (Painter, 1971) has pursued this goal, with admirable success (see appendix A, section IV).

Discussion

The programs reviewed in appendix A have achieved some very impressive results and clearly indicate that infant education is a productive line of research, but there are two large problems in drawing any

more specific conclusions, which one obviously wishes to do, and which, therefore, must be avoided in future research. The first problem is the potential lack of internal validity. Every research project is based on certain assumptions which the investigator should carefully define. To say, as Painter (1971) does, that one's work is based on "...psychological principles of infant development..." enlightens neither the researcher nor the reader. The merit of the entire work rests on the validity of its assumptions, and often these assumptions are not adequately tested. This phenomenon is particularly evident in those programs which are founded on Piagetian theory. The Children's Center (Programs, 1970); The Florida Parent Education Program (Gordon, et. al., 1973, 1974); The Infant, Toddler, and Preschool Research Project (Bricker and Bricker, 1973, 1974); and The Nationally Organized Collaborative Project to Provide Services to Handicapped Infants and their Families (Haynes, unpublished, 1974) claim such foundations, and other programs seem to have certain Piagetian elements. As Ross and Leavitt (1974, unpublished, undated, p. 12) so aptly remind us,

> ...interest has developed in the remediation or acceleration of intellectual development by training the operations that characterize stages of development. Such attempts rest on the assumption that Piaget's observations have identified processes and behaviors that are more basic and important than those examined by the usual psychometric tests, or the specialized tests of cognitive, perceptual, or language performance developed for test batteries. This assumption is quite probably correct, but it remains to be determined whether the Piagetian operations are

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> in themselves of such fundamental importance for general intellectual development that 1) their use in evaluation will provide more useful descriptive and predictive data than other tests and 2) by training the operations that characterize the stages of development the child's intellectual ability will be so transformed as to have far reaching and lasting effects. These are empirical questions that must be submitted to rigorous experimental test.

The problem is a very serious one, but, as Ross and Leavitt (1974) indicate, it is not an insoluble problem.

There are basically two ways of affirming the validity of an assumption. One may submit it to an empirical test or one may adduce evidence from other sources to support one's premise. The latter method is the one most frequently employed and is quite appropriate if certain criteria are met, but like any method, it should not be employed indiscriminately. This approach may be quite valid if other investigators have tested the assumptions that one makes; there has been successful replication; and different investigators have not obtained contradictory results. Such circumstances are rather rare, though. A preliminary empirical investigation, the second way of affirming an assumption, has a number of advantages:

1) When results are positive, it offers sound, imminently appropriate support for the program developed;

2) When results are negative, it prevents the instigation of a program which has invalid bases.

3) Regardless of the results, it forces the investigator to realize and articulate his biases.

An example of the employment of a variant of this method can be found

in the work of Bricker and Bricker (1973).

Another tack sometimes taken in the affirmation of the validity of assumptions is a sort of backwards proof by fire. One says that program A is based on assumptions X, Y, and Z; implements the program; achieves the desired ends; and, therefore, states that the assumptions are valid. Such an argument is quite fallacious. It could be that an empirical investigation would show that the assumptions were not really valid, suggesting that other factors led to the program's success. Such discontinuity could greatly obfuscate the literature and could lead to the instigation of other programs based on these principles and lacking the factors which truly precipitated the original success, resulting in more confusion and perhaps disasters. The success of the program proves only that what one did was correct, not that what one intended to do was correct, unless one can link the two.

This tack demonstrates another aspect of the problem of internal validity. Is the program truly based on the assumptions advanced? A successful (or unsuccessful) test of the assumptions combined with successful (or unsuccessful) program would tend to suggest continuity, but does not guarantee it, while an unsuccessful (or successful) verification of assumptions combined with a successful (or unsuccessful) program would suggest other variables at work which could point the way to the delineation of these variables. Continuity could best be insured (though not guaranteed) through the construction of a curriculum

soundly grounded in the principles espoused and tested--in short, the productive synthesis of theory and practice. Thus, while the research supports the program, the program may complete the cycle by reinforcing the research proving that it has both truth and functional value or it may terminate, suggesting that if the assumptions are true, they are not accurately reflected in the program or lack functional value as employed.

Following such a research-curriculum model would increase the meaningfulness of each program in and of itself and could also make some progre s toward the solution of the second major problem of program assessment. Assessment of the meaning of the programs as a group is rendered extremely difficult by their radically different structures. In general, it may be said that each program provides interesting information and is suggestive of a vast potential for research and application within the field of infant education. Beyond this, it is difficult to say what one may conclude. Each project attacks the problem from its own perspective and the relative emphasis placed on the program as research and the program as an applied, working program varies widely. A comparison across programs of any of the descriptors employed in the reviews provided in appendix A reveals the radically different tacts taken in each of these important program factors making attempts to decipher what the programs mean as components of a wider area of research extremely difficult except in the broadest and vaguest terms--the area seems capable of producing fruitful research. General agreement to a format such as that suggested here involving an

interaction of empirical assumption testing and curriculum development would greatly facilitate comparison and evaluation of programs, and, in general, improve the state of the art, and, hopefully, the state of the infant, and ever onward to the universe.

In the next two chapters we will present a model of such research-curriculum interaction derived from Piagetian theory (which is directly or indirectly implicated in most or all of the programs reviewed in appendix A). This choice is not met to suggest that the paths outlined by Piaget constitute the only course available to infant educators. In fact, it is quite desirable that the functionality of other orientations be explored as well. Nor is it to suggest that Piagetian theory is to be preserved fully and without modification in future projects. In the thirty year period which has elapsed since Piaget's articulation of his theory, much important and valuable research has been done which should be taken into account (see Mussen, 1970; Mussen and Carmichael, 1964; and Stone, et.al., 1973).

However, this research has not yet been integrated to form a coherent alternative theory, nor has it been employed to systematically build upon Piaget's foundations. Such a coherent theory is necessary for the formulation of a project following the research-curriculum model outlined herein. It is for this reason, then, that the proposed model is strictly Piagetian, and not because such an orientation necessarily and/or fully represents the best of all possible approaches

Chapter 3

A Research Model/Piagetian Theory

Through exhaustive observations of his won children Piaget has delineated an elaborate and elegant system which he calls sensorimotor development to explain children's cognitive growth from birth to $1\frac{1}{2}$ - 2 years. However, one can hardly define the world or generalize to a larger population with an N of three, particularly when all three come from not only the same culture, but the same home environment. Thus, while the theory derived from these observation is most enticing, it could benefit from more empirical support--if it is in fact tenable. The problem rests in how to obtain this verification or denial. It is most difficult to experiment with infants in this age range as they are notoriously uncooperative. The most logical tack is that taken by Piaget: longitudinal, naturalistic observation interspersed with simple motor experiments to substantiate and clarify observations.

Two serious difficulties arise from such an approach, however. The first is the prohibitive amount of time required to perform such a study and the second is that encountered by Piaget--observing enough subjects to allow widespread generalization. The solution which psychologists have generally arrived at to avoid these obstacles is the cross-sectional method. That is, one might observe groups of infants within the age ranges which can roughly be assigned to the stages of

development which Piaget posits. Again a problem arises. According to Piaget, the sequence of development followed is invariant, but it is not necessarily age locked, being affected by inherited capacity and environmental factors. Thus, age may be employed as a general guideline for infant selection for the study but does not guarantee the final assignment of X number of infants to each stage. However, this complication may in fact prove a boon in allowing the assessment of Piaget's assertion that age and stage are not related a priori and, if this proves true, the degree of variability in the age-stage relationship.

For such a study it is necessary to ascertain in as far as it is possible that the infants participating are "normal". The aim is to verify the existence of a certain normal developmental sequence, not to define deviant groups. While the latter goal is an exciting one, particularly with such young age groups, and is hopefully a natural by-product of the definition of normal patterns, it is a matter for future study. While it may be that development at this level is insensitive to any abnormality short of massive brain damage, severe deformity, and death (which seems very doubtful), the possibility of the admission of potentially abnormal infants adding variance to the present study is to be avoided. Toward this end, one could investigate the medical records of potential subjects and eliminate those showing evidence of birth complications which might adversely affect early development (i.e., prematurity, oxygen at birth, maternal illness, poor fetal heart tone, etc.). Another useful, though partial, screening

mechanism would be a parental interview to assess the infant's general development via one of the developmental scales already available. Obviously, for policy reasons one ought not eliminate an infant at this stage (I'm sorry, Ms. Jones, but your infant is abnormal, so we can't use him."), but such information should be taken into account in the final analysis.[1] Such a procedure would also allow the experimenter to assess the degree of correlation between such parental interview scales and the Piagetian development model. If there proves to be very little correlation (particularly if it tends to be a question of the parents' responses placing the infants at a higher level than the observation and Piagetian assessment does), one might wish to rate the observations on another of the available scales. If the correlation between the two observational scales is high, parental bias might be suggested; if it is low, this is either an indication that the Piagetian scale is inappropriate (particularly if the other two scales correlate well) or that both of the other two scales are inaccurate (particularly if there are no significant correlations) or all three or any two of the three are worthless. At any rate, it is an interesting question. Also, in order to have as homogeneous a group as possible, one might also wish to gather information regarding parent's educational, professional, and SES levels as gross guidelines

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[1]Perhaps to save both time and trauma such an infant could receive a shortened version of the entire procedure. Information about such infants in unquestionably interesting, but could be more logically collected after this type of preparatory assessment of the theory and method.

to hereditary capacity and environmental influence and select infants with similar (and probably "average") backgrounds. The function of a prepatory study such as the one herein proposed is to see if the theory works under the best possible circumstances (next to Piaget's exact procedure) and it is therefore imperative to remove variance whenever it is possible.

A pre-experiment parental interview could also be useful in alleviating some of the problems introduced by the substitution of the cross-sectional method for Piaget's exhaustive longitudinal method. For the older infants one could devise a questionnaire listing some of the general behaviors relevant to each stage and ask the parent to check those which he has observed. Such a device would be of some use as a supplement to the rough initial assignment of infants to a stage. However, this supplement does not make the assignment definite as parents are unlikely to remember or know whether or not the act was intentional or how to recognize in retrospect some of the subtle nuances so vital to Piaget's delineation of development.[2] Parents should also be asked to bring in some of the child's favorite toys and to select from a group of toys made available by the experimenter those which would be novel since response to familiar objects versus response to novel objects is a key distinction in Piaget's system.

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[2]This assignment is in no way permanent; it is simply to guide the experimenter in his selection of objects to be used in the observations and simple experiments to be performed. If these experiments succeed, one moves forward until the appropriate experiments fail, then backwards a little.

The author's thesis is that one should study a number of infants cross-sectionally in much the manner of Piaget, attempting to observe the behaviors which he reports as characteristic of each stage and performing some of the simple experiments which he has invented to clarify and expedite observation (see appendix B, section I for a detailed summary). Given this aim, time sampling does not seem like a viable mechanism of observation. It is desirable in the present circumstances to validate prior observations, so it is neither necessary nor productive to sample randomly. The experimenter is herein concerned with observing particular types of behavior and not all behavior (the question is as much, or more, what can the infant do than what does he do).[3] Furthermore, it is essential to observe the operation of the complete schema within the Piagetian framework whereas time sampling might cut out of the observation a large initial and essential portion of the schema or an entire behavior which might be of great importance for the present purposes.

After admitting and observing an infant, one would analyze each of his behaviors according to the Piagetian scale (see appendix B, section II). For those not yet adept at traversing the Piagetian maze of mystical meaning, it might be useful to first try matching the observation to be analyzed to those already scaled by Piaget and then to try a full-blown theoretical analysis with the facilitative support

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[3]This is not to say that the experimenter should take note of only these particular behaviors that Piaget reports. It is desirable to observe such behaviors to verify the generality of Piaget's observations and the appropriateness of his selection. However, it is also desirable to observe different behaviors (unless Piaget has covered all the bases) to assess the adaptability of his model to new data.

of analogy. Owing to the continuity of the system, and theoretically, of this developmental period, it would not be surprising to find behaviors spanning three stages with the bulk concentrated in the middle stage. In fact, it would be surprising and somewhat debilitating to the theory not to find this spread since if development is indeed continuous some earlier behaviors should carry over and some new behaviors should be emerging. Since the present observation is not to be longitudinal, some of the infants might be observed in a transition period exhibiting large numbers of behaviors from two stages. However, large fluctuations within an infant and huge age-stage schisms either between or within infants would not favor the Piagetian model. Although all three are supposedly derived from the same ideas and framework and seem quite interdependent, rating an infant on three scales all derived from Piaget's work (intellectual development, the development of imitation, and the development of play--see appendix B, sections II, III, and IV) might shed some light on the internal consistency of the system, and if consistency is generally found, serve to define another abnormal group--those whose development within the three scales is not consistent, perhaps the emotionally disturbed infant.

So what? What benefits derive from supporting or refuting the Piagetian model of development? If research of this sort gives the Piagetian system strong support, the next logical research goal would be to define abnormal groups via this mechanism to assess normality. If the scale defines all infants as normal, either it is really not sensitive to the important developments of infancy or all but the most severly damaged infants develop in the same way (i.e., "normally") up

to the age of 1½ - 2 years. If the former is the case, the model is not worth much, although it may be perfectly valid. If the latter is valid, the model has all the value of "knowledge for its own sake" and suggests research in this area has little immediately practical application although such a phenomenon is theoretically fascinating. On the other hand, if the scale defines some infants as developing abnormally--at a very slow rate or, more importantly, out of phase--a number of interesting questions arise--the permanence of this abnormality; is it a precursor of intellectual and/or motor and/or emotional deficit; can an infant develop normally in the intellectual and motor realms while displaying and emotional (play) deficit; is this developmental disorder linked to membership in high risk groups defined by birth trauma such as prematurity, etc. Another interesting aspect of Piaget's observations and theory is that he indicates that certain types of training and experience can accelerate the developmental process (e.g., Laurent learned to grasp early due to training of the schema of joining his hands) (Piaget, 1952, p. 106); Jacqueline acquired the stick behavior in stage V through experimentation since the problem confronts her at this period while Laurent acquired this behavior in stage VI via mental elaboration) (Piaget, 1952, p. 333). If early abnormal development is a precursor of later retardation, can this result be avoided through early detection and the immediate instigation of stringent, comprehensive training programs to lead the infant successfully through the necessary behaviors in sequence?[4]

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[4]The perfect place for such studies would be an orphanage where infants have typically shown retarded development due to lack of stimulation and absense of change in the environment.

Can the natural abilities of a normal infant be accentuated by such a program?[4] Can disadvantages be avoided?[4] These questions are logical derivations of Piaget's theory. If that theory is indeed accurate, these questions can be empirically addressed.

00034

Chapter 4

A Proposed Piagetian Infant Curriculum Model

Just as the idea of infant education suffers from the association of the term education with formal traditional schooling, the idea of an infant curriculum is likely to suffer from the common definition of curriculum as a device for teaching. The proposed Piagetian curriculum aims to facilitate the normal course of development, not to "teach" the infant in the usual sense of that word. Taking the Piagetian view of development, it is impossible to teach the infant skills which are inappropriate for his stage of development. In fact, constant bombardment of the infant with situations which he is not able to deal with can be detrimental to the infant. Given this consideration, great caution must be observed in the use of such a curriculum. The dictum that if a little is good, more is better is not applicable.

The proposed curriculum model has four basic components. The first section defines the principles which form the psychological foundations of the model. This section is followed by the planning component which explains the settings appropriate to the model; the goals, the influences on the model; and the design rationale. "Scope and sequence" represents a statement of the aspects of development to be facilitated by any teacher employing the model and the order in

which "teaching" should proceed. This section provides general guidelines for the teacher which may be further refined to create a more specific, concrete format of goals, assessment criteria, and developmental activities (see appendix C). In the evaluation section means of assessing the effectiveness of the curriculum as employed are discussed.

Psychological Foundations

Project Head Start was envisioned as a means of uplifting the "disadvantaged" child. However, a number of evaluations seem to indicate that the effects of the program, if existent, tend to be short-lived. Project Head Start has been termed "too little, too late." Perhaps more would help, but my own inclination is to view the problem as being one of point of attack. Repeatedly, in diverse situations, cure has proven for more difficult than prevention. For any attempt at prevention Head Start is much too late. Piagetian theory places the origins of intelligence in the first two years of life. Assuming contrary to the traditional image of the infant, Piaget views him as an active organism constantly engaged in the business of learning. (1) It is not necessary to instruct him; in fact, it is impossible. However, one may enhance the infant's abilities by facilitating his development through the arrangement of opportunities for him to learn and practice the skills which infants of his age typically exhibit (2). Piaget's observations of his own three children have led him to posit

00036

stages of development in what he calls the "sensorimotor period." The infant is perceived as moving from life on a purely biological/physical plane to some degree of intellectual competance. If in fact these cognitive abilities form the basis of the child's later intellectual abilities, it would seem only logical that early deficits form the basis of later deficits. Thus, if one wishes to avoid later deficits, one must begin at birth. The basic process which one must foster is equilibration or the balance between assimilation and accommodation, assimilation being the adaptation of reality to fit the infant's cognitive structures, and accommodation occuring when the infant adapts himself to reality (3). Equilibration is influenced by the infant's inherent capacities and by his environment. The developmental sequence followed is invariant for all normal infants, but the age at which a given infant reaches each stage varies in conjunction with his inherited abilities and his environmental experiences. Thus, an infant can be provided with stimulation to develop the skills relevant to his stage, which can lay the groundwork for more advanced skills, but it is impossible to "teach" him the skills of a stage which he has not reached. The infant learns through the manipulation of objects in his environment (4). All learning in the Piagetian model is essentially inductive. Piaget's conviction on this point has obvious bases for discussion of the young infant, but is not restricted to him. High-level thinking activities are not tied to language in the Piagetian model of cognitive development (5).

Planning Component

This curriculum model for infants from birth to two years of age is designed for the use of parents in the home in cooperation with a home visitation teacher whose function is to elicit the support and cooperation of the parents, explain the program to them, assist them in its implementation, and monitor the progress of the infant and parents. This orientation is taken since one would logically expect most infants in this age range to be in the home given current family practices. However, the program can easily be adapted to use in an orphanage or day care center setting since it requires little equipment, minimal staff training (aside from the director or home visitation teacher, and a cookbook procedure could be prepared to eliminate her, although it is most desirable to have someone who really knows what's going on in theory, especially when problems arise), and minimal time expenditure (G. Painter suggests 15 - 60 minutes per day depending on the infant's age) beyond the normal maintenence time required. The parent is employed as infant "instructor" for practical reasons, but there is no reason why the instructor need be a parent, given the structure of this model.

The proposed model has four basic goals: to enhance the infant's cognitive development and prevent later deficits; to detect learning disabilities at an early age, if possible; to involve an adult or a restricted number of adults with the infant and provide a supportive social setting for the infant; and, to collect evidence supporting or

refuting the efficacy of infant education following a Piagetian model. Another goal for a home visitation program might be to improve the quality of parenting, the parent's self-image, and the parent-child relationship. This goal is not among those listed as fundamental to this program for several reasons: there is very little research on the subject to suggest whether or not this is a tenable goal; the main thrust of the present program is the infant's development, so the design does not include suggestions for parent development; there is no coherent theoretical framework for such an additional component, especially not within the realm of Piagetian theory; and, this model is not to be restricted to home visitation, although such use is its main focus. However, it seems only logical that a program affecting the infant, requiring infant-parent interaction, and providing the parent with information about human development as it relates to his infant will have a positive effect on the parent. The use of a model such as this in a home visitation setting could provide empirical support for such a contention, making it a valid goal and suggesting a framework for achieving such a goal.

The major constructs for developing this model have been taken from The Origins of Intelligence in Children by Jean Piaget (1952). Qualification is necessary by virtue of the fact that Piaget's theory is based on observations on his own three children which constitutes some validation, but is hardly hard core proof. In so far as Piaget is both a psychologist and a philosopher who has some understanding of human growth and human knowledge. all of these influences are involved. Piaget's experiments have affected his theory and thereby this model.

Other research also supports and further defines the present curriculum model. Benjamin Bloom (1964) has asserted that his summary of one thousand studies of infant growth that the bulk of the data indicates that a child's intellectual capacity is well established by the age of four, indicating the profound importance of the early years for later education. It hardly seems that such an important period of development should be left to chance! Burton White (1973) has reported that most parents generally treat their infants the same during the first year of life, viewing their infants as passive and their jobs largely as custodial. From the Piagetian standpoint this may be (probably is) a serious mistake. In the second year of life when the infant becomes more obviously active and inquisitive, White has observed wide differences in parent behavior. In some families this change leads to an increased degree of interaction between infant and parents and attempts to meet the infants now more obvious cognitive needs. In large families of small dependent children, the parents' aim at this point is often to keep the infant out of the way and subdued Such treatment is also common in orphanages, infant care centers, homes in which both parents work, and may well occur in homes in which there is no reason beyond ignorance of the child's intellectual needs or indifference toward the infant. Common sense philosophy often views the infant as requiring nothing more than physical maintenence. The findings of White's research which tend to portray the use of "common sense' may reveal the beginnings of the "disadvantaged" child. If the infant is to remain in the home, it is the parents' behavior which first

needs changing. Two studies have demonstrated that parents are effective teachers and a number of new projects are founded on this assumption: Home Start, Saturday School, Operation Uplift, the Parent Readiness Education Project, and several others (ECE, 1973) (Early Childhood Education, 1973); (Painter, 1971).

Perhaps the most impressive research pointing out the need for infant education is that of Painter (1971). Using her own program, which has many similarities to the present model, she and two professional teachers raised the IQ's of thirty babies to an average of ten points higher than those of thirty untutored babies selected as controls. Even more impressive, mothers instructed in the use of the program raised the IQ's of their own children by an average of sixteen points over a control group. Dennis (1960) and a number of other investigators have empirically verified the common observation that infants reared in orphanages with minimal stimulation are much slower developmentally than normal infants reared in normal homes and are more prone to exhibit learning disabilities and mental retardation.

Another influence on the present curriculum which is of secondary import to the designer, but may undoubtedly be what sells the idea of infant education is its fundamental economy. Application does not require highly specialized staff or equipment and may be carried out within the home as well as the institution. Furthermore, such a program is vastly less expensive than maintaining a large number of children in mental health institutions, special education, and learning disabilities programs.

The delineation of the basis of this curriculum model for young infants is a direct derivative of Piaget's definition of the origins of intelligence in the sensorimotor period. The developmental order observed and reported by Piaget is preserved intact. Piaget has divided knowledge into two categories--physical and logico-mathematical knowledge (Kamii, 1973). There is no use of logico-mathematical knowledge in the sensorimotor period although aspects of physical knowledge which under lie some logico-mathematical knowledge can be seen in the child's concept development (causality, time, etc.). The category of social knowledge which is often included in Piagetian-type curriculums was added by Sinclair-de-Zwart and is not strictly Piagetian. The importance of a supportive social setting for satisfactory cognitive development is noted, but social development is not a prime interest or aim of this curriculum except to the extent that it is necessary to, and, I think, from Piaget's standpoint inseparable from cognitive development. This point is exemplified by the development of the object concept which while clearly reflecting a developing cognitive concept is also inextricably tied to the decline of egocentricity.

Scope and Sequence

Each stage is associated with a simplified statement of the associated process skill. For a description of the same process skill in greater detail and Piagetian terms, see appendix B, section II. The subtopics

constitute descriptions of the associated product skills and under each description is the concept toward which the product skill is building and a more concise description of the skill. By strict Piagetian definition there are no true concepts in this period, but this period lays the foundations for important concepts which emerge later. For more detailed and Piagetian examination of the development throughout stages of a particular concept/product skill, see the outlines of play and imitation development provided in sections III and IV of appendix B. The concepts/product skills are not hierarchically ordered.

I. Stage I - Intelligence develops from innate behavior patterns.

A. Through experience with sucking and eating, the infant learns to recognize the nipple and search for it when he loses it.

1. Concept: Object concept

2. Product skill: recognition, search

B. Through experience with feeding the infant learns to reject unwanted substitutes for the nipples

1. Concept: Classes

2. Product Skill: coordination, classification

II. Stage II - The child begins to make nonhereditary adaptations and simple movements such as grasping, sucking, vocalizing, or looking for their own sake (to practice) which him to interact repeatedly with the environment and display intelligence.

A. Through the coordination of sensory abilities the child can get a better picture of an object by simultaneously recognizing more than one quality. He shows some indication of primitive understanding of the object as separate from himself by watching the spot where an object disappeared for a brief time.

1. Concept: Object Concept

2. Product Skill: coordination, recognition, search

B. Through his sensory development and greater motor control the infant gains the ability to imitate actions highly similar to those which he can already perform.

1. Concept: correspondence between child and model

2. Product Skill: Imitation

C. The child learns to practice the skills which he has acquired when there is no apparent need to use them.

1. Concept: Doing something for its own sake (pleasure).

2. Product Skill: Practice Play

D. Through his new abilities the child shows an interest in moderately novel events.

1. Concept: novelty

2. Product Skill: exploration

E. The child shows some primitive anticipation of future events making possible things such as the association of position for feeding with sucking behavior.

1. Concept: Time (future)

2. Product Skill: anticipation

III. Stage III - The infant begins to try to maintain interesting results which he produces by accident.

A. The disappearance of an object leads to visual and tactual search if the infant has caused the object's disappearance, but the only search method used is the behavior that the infant was performing when the object disappeared (was lost).

1. Concept: Object Concept

2. Product Skill: search

B. The child is most likely to imitate you after you imitate him.

1. Concept: correspondence between the child and the model

2. Product Skill: Imitation

C. The child learns the "pleasure of being the cause" and turns every new skill into a game.

1. Concept: Doing something for its own sake

2. Product Skill: Practice Play

D. The infant begins to group objects according to their results--something to rub and make noise, something to shake, etc.

1. Concept: Classes

2. Product Skill: classification, grouping

E. The infant discovers simple relations such as that between the intensity of his action and the intensity of the result.

1. Concept: Relations (Temporal)

2. Product Skill: Ability to foresee effects

IV. Stage IV - The infant learns to coordinate the behavior patterns of the last stage and apply them to new situations.

A. The infant becomes capable of seeking objects which disappear, thereby attributing some permanence to them separate from the child himself although he cannot follow a complex series of displacements.

1. Concept: Object Concept

2. Product Skill: Search

B. The child begins to imitate novel behavior of models (like sticking out his tongue) which he can't see, but not very successfully.

1. Concept: Correspondence between the child and the model

2. Product Skill: Imitation

C. The child develops the new skills of this period into games

1. Concept: Doing something for the sake of doing it

2. Product Skill: Practice Play

D. The infant begins to anticipate events which do not depend on him--for example, he expects people to act in certain ways--and therefore begins to recognize centers of force separate from himself.

1. Concept: Temporal Relations (Time, future)

2. Product Skill: Anticipation

E. The child learns something about spatial relations of objects; removing an obstacle teaches him the relationship "in front of".

1. Concept: Spatial Relations

2. Product Skill: Perceive and deal with obstacles

F. The infant learns that any object can be source of activity, not just himself.

1. Concept: Causality

2. Product Skill: interprets events more realistically

G. The infant learns to see an object as the same regardless of the angle at which he sees it.

1. Concept: Constancy of form

2. Product Skill: Objective recognition

V. Stage V - The infant begins to vary movements which have caused an interesting result in order to study the effects of these variations and through active experimentation discovers new ways to reach his goals.

A. The child can follow a complex series of displacements of an object.

1. Concept: Object Concept

2. Product Skill: Search

B. The child successfully imitates new actions and sounds of models

1. Concept: correspondence between the child and the model

2. Product Skills: Imitation

C. The child develops rituals or combinations of skills which have no practical relationship or use and performs them

1. Concept: Doing something for the sake of doing it

2. Product Skill: Practice Play

D. The child's interest in novel events increases

1. Concept: Novelty

2. Product Skill: Exploration

E. The child learns that time is a sequence of external events

1. Concept: Temporal Relations (time, related to object)

2. Product Skill: anticipation

VI. Stage VI - The infant becomes capable of inventing new means through mental combination.

A. The infant can reconstruct a series of invisible displacements of an object because of his new powers of representation

1. Concept: Object Concept

2. Product Skill: search, representation

B. The infant can imitate a model which is no longer present

1. Concept: correspondence between the child and the model

2. Product Skill: Deferred Imitation

C. The child shows beginnings of pretence and make-believe

1. Concept: Doing something for the sake of doing it

2. Product Skill: Symbolic Play

D. Time is extended into the past and future

1. Concept: Temporal Relations

2. Product Skill: anticipation, remembering

E. The child can reconstruct causes in the presence of their effects alone

1. Concept: Causality

2. Product Skill: Deducting causes

Evaluation

Within the Piagetian system, two basic methods of evaluation are available: observation and simple experimentation to elicit characteristic behaviors. Formative evaluation is defined by the infant's ability to perform activities like those suggested in appendix C, thereby reflecting the operation of the process skills characterizing each stage of development. Each formative evaluation beyond the first one is itself a summative evaluation in so far as development within the present model is cumulative, progressive, and continuous.

However, to fulfill the research goal of the model, it would be desirable and informative to employ a variety of evaluation techniques, as was noted in the previous research proposal, to assess the relationships of the Piagetian approach to more traditional techniques like the Bayley and Griffith infant development scales. The use of traditional techniques is particularly important in view of the finding of Walker and Schaffarick (1974) that in general innovative curricula improve performance on innovative tests but not on traditional ones.

Chapter 5

Implementation and Conclusions

Infant education seems like a good thing for infants and investigators alike. It is a productive line of research which has profound implications for those involved and can have great internal and external validity. An important factor is still unconsidered, though. "Those involved" are not only infants and isolated investigators.

The research cited (see Chapter 1 and appendix A) points out the needs and interests of the infant and demonstrates a number of ways in which they can be met. However, another important group that must be dealt with is the parents. Within the current social system parents have control over their young children. One can say that the right to develop to his maximum potential cannot be denied a child and even legislate that right, but without changing some widespread misconceptions and convincing parents of the many benefits of infant education, enforcement will prove impossible. These misconceptions are the ones noted earlier--that infants don't learn, the whole idea is silly and impossible--with one addition: many parents also tend to think that education (due to their exposure to traditional public education) is just too cruel a thing to inflict on such young children; let them have fun for a while before pushing them unto the path of work and woe. Perhaps the title of infant programs should be changed to infant development programs

instead of infant education. Misconceptions of this sort form one of the greatest barriers to infant education--for most people it is simply not a logically possible solution to the Head Start problem of "too little, too late."

It may well be for this reason the people have largely concentrated on the "too little" portion of the problem. When people do not find the idea of infant education humorous, they find it terrifying, and rightly so to the extent that it conjures up images of babies in Skinner boxes in bland, sterile institutions turning out identical little packages chocked full of communism and lacking individuality. First, it must be admitted that the aim of infant education is to remove certain individual differences--those termed disadvantages. Other individual differences ought to actually be maximized by a development facilitation program (Hunt, 1961). Secondly, infant education, being in the present sense aimed at facilitating the natural development of the child, will foster communism only to the extent that it is the natural product of rich cognitive, physical, and social development.

Furthermore, it ought to be pointed out that infant education of the sort proposed here can as easily be carried out in the home by competent parents as in an institutional setting. It must be emphasized that the main benefits of a day care infant education program are for the parent who is freed from the task of caring for and "educating" the infant and thereby may work and better provide for the economic needs of the family unit. These benefits are most obvious for the poor and

single parent families. A number of other direct benefits of home oriented programs for mothers have been reported by some investigators. As a result of Gray's Early Training Project which was a behavior modification oriented preschool program which concentrated on mother-child interaction and provided parental education during home visits, half of the low income mother involved either finished high school or took vocational courses: in general the mothers are reported to have become more concerned with community affairs and more involved in cooperative adult activities (Fein and Clarke-Stewart, 1973). Increases in family bank accounts were also shown. The Milwaukee Project based on the premise that cultural-familial retardation can be prevented by family intervention beginning with the infant's birth and focusing on the mother has educated and placed in jobs women who were initially classified as unemployable (Heber, et. al., 1972). Gordon reports an increased belief in internal control in the low income mothers involved in his program (Fein and Clarke-Stewart, 1973). Although somewhat intangible, this result is important, for fatalism has often been identified as one of the most devastating characteristics of members of the lower class. Thus, certain infant education programs can benefit not only the infant but also his parents (most directly the mother) and society.

It seems likely that parents, who have a strong personal interest in their infants, can be persuaded of the potential advantages of infant education, but there is another nebulous group that also has needs which must be met. Society will probably be required to foot part of the bill for the development and establishment of an infant education

system. Society does have a vested interest in its children, and it is to the benefit of society at large that every child develop to his full potential. However, society also has a vested interest in its money. The economy of prevention when compared to cure seems obvious. Such a development is likely to decrease the number of mental institutions required (see Heber, et. al., 1972) and possibly even reduce the need for such institutions as prisons and should greatly reduce the need for costly remediation programs.

However, someone is sure to point out that only a relatively small number of children are likely to develop deficiencies and as there is no way to identify them at birth (in most cases), you will be wasting most of the education (and money) on infants who would never have developed a problem. Evans and Saia (1972) estimate that high quality infant day care including an infant education program would cost about $56.00 per week per infant. That is a lot of money, but it is cheaper than maintaining large numbers of people in our various wastebin institutions for life--both in terms of money and human life and resources. The idealistic response is that there is reason to believe that these infants may be even better than they otherwise would have been and that is certainly desirable. Furthermore, the great expense combined with the questionable success of remediation programs may make a huge scale infant development program much more profitable in all actuality.

The pragmatist might suggest that it is possible to define high risk groups by such factors as SES, family structure, and educational

level and to concentrate efforts, at least initially, on the infants in this designated group. Any program based on such generalizations is bound to be imperfect, but it would probably have some validity and would be more economical than the ideal program. Furthermore, part of the cost of infant day care could possibly be assumed by the family of the infant as it is a service to them and in many cases permits both parents to work, thereby increasing the family's economic resources (and the nation's). If even this does not seem economically feasible, remember that it is the cost of high quality infant day care with education which Evans and Saia (1972) estimate. There are viable alternatives (as the research clearly shows). A number of programs employ the home visitation procedure which has had a great deal of success and which could be very inexpensive. For example, the Gordon model requires only a one hour per week visitation by a person who has completed a brief course (Gordon used low income women) and a weekly group instruction period for mothers conducted by the home visitation teacher (Gordon, 1973, 1974). If the teacher contacted thirty infants a week and received pay of $100.00 to $150.00 (probably liberal), the expense would be $3.33 to $5.00 a week per infant.

In fact, it seems likely that parents can pay for programs aiming at maintenance and enhancement, particularly in view of the fact that parents involved in such programs will probably be middle and upper class. The same will also be true of many parents whose infants require remediation for biologically based disadvantages. Also, the enhancement and maintenance goals and possibly even prevention and remediation could

be very cheaply carried out by the parent in the home through the substitution of television courses in infant stimulation--Sesame Street has set that precedent--or a prenatal course in environmental enrichment techniques and a guidebook like that designed by Painter (197 for the organized professional programs cited.

Infant education is not just a topic for research; it is a potential social institution. Viewing it as such from the outset, steps can be taken to try and insure that if established, it is done so rationally and with an existing mechanism for direction and orchestratio Infant education has pervasive implications for every sector of society and as such is not just an area for scientists to investigate; it is, as much, a question of public policy.

Two major options exist which can form the basis of public policy regarding infant education. One may maintain the status quo, basically no systematic infant education, which after all, seems to be functioning and has functioned in our culture for some time. However, a basic logical fallacy underlies this position: to be different from the past and present is the very nature, indeed, the definition, of the future. The seed for future differences can already be seen in the disappearance of the extended family and the weakening of the nuclear family and the increased tendancy for mothers to pursue employment outside of the home. In view of the fact that traditional institutional facilities have left much to be desired, the status quo option seems short-sighted, ill considered, and in general lacking in long term viability.

Given that the universe is ultimately composed of binary choices, the second option is infant education. Variants on this option may be defined by the possible goals of infant education programs which are basically fourfold: 1) avoid "disadvantage"; 2) remediate defined disabilities; 3) maintain normal development; and 4) enhance development. Theoretically, then, these are the possible options. However, while it seems that some infant education programs have benefits, it is often unclear exactly what the benefits are; what constellation of variables produced the benefits; and how permanent these benefits are--if they are permanent at all. Furthermore, the relative efficacy of various programs is totally unexplored and the relationship between the benefits of any given program and membership in a defined subgroup of the total population of infants is but vaguely understood. The cost-benefit relationship is entirely undefined and with the present information, probably undefinable. Again the question of comparability of existing programs looms large. Before any comprehensive infant education system can be established, a large scale, longitudinal, infant education research program should be undertaken to clarify these matters.

A large scale longitudinal investigation seems a priori like a grand and noble undertaking. However, as Bell (1953, p. 146) so aptly reminds us, "A longitudinal approach should be selected, as any other method, on the basis of its appropriateness to the problem at hand. The problem is when to apply the longitudinal method rather than how

to marshal the courage to face the task." It is necessary first, then, to ascertain what qualities make the general question of infant education one which is appropriately addressed through the vehicle of longitudinal study. Gallagher, et. al. (1973, unpublished) cite seven sorts of general problems as requiring a longitudinal design for investigation. The problems underlying the definition of infant education clearly fit these categories:

> Cumulative impact of independent variables--education (learning) might well be defined as the cumulative impact of independent variables! Bell (1953, p. 146) states that in investigating such a problem "...a longitudinal approach must be used."
>
> Dimensions underlying behavioral change--in so far as education is as intent on influencing behavior as it is on presenting information. Since a primary aim of education is to alter the structures which underlie behavior (which one might suppose to be something like intellect and personality, if that clarifies anything), it would be of obvious benefit to know what those structures are. Here also "...a longitudinal approach is essential (Baltes and Nesselroade, 1970)."
>
> Variables showing small changes, sequences, and rates of change, disappearing signs--if education may be broadly defined as the facilitation of development, (the attitude taken here), which process is the epitome of the above description, then the questions of education in general and infant education in particular should be addressed longitudinally.
>
> Changes in the interrelationships between variables--"A longitudinal approach is necessary when one wants to examine the interrelationships of environment-organism variables and how these interrelationships change over time (Gallagher, et. al., unpublished, 1973, p. 8)." What could be more fundamental to infant education as considered here!

00056

> Patterns of individual differences--Education cannot mold without adapting, as the functioning of assimilation generates accommodation.
>
> Process emergence--Learning is the ultimate process.
>
> Definitive test of stage theories--This need is exemplified in the model for Piagetian infant education advanced earlier.

While it certainly seems that the problem at hand is well suited to longitudinal investigation, there are certain limitations to this approach which must be considered and either overcome or taken into account in all stages of evaluation. Gallagher (et. al., 1973, unpublished) list the following limitations to the longitudinal approach:

> Generalization to other age cohorts limited due to typically small N's--This consideration forms part of the basis for the argument for large scale research.
>
> Evaluation of treatment effects in intervention programs--The absolute necessity of adequate experimental and control groups is evident in this respect.
>
> Artifactual results from repeated measure designs--Repeated use of evaluation instruments may produce a change in results which has no real relationship to the treatment variable. When standardized evaluation tools are used, an added control group which receives all testing but not treatment is generally deemed adequate compensation. One avenue of avoidance of this factor is the use of observation as an evaluation method. The functionality of observation as evaluation and the correlation between observation results and results derived from standard evaluation techniques could be investigated if these two types of evaluation were used as independent variables.
>
> Necessity for limitations on, and justification of types of data collected--Longitudinal studies, in their zeal to save the world, have often been too global and idealistic. The proposed research

> is seriously threatened by this pitfall. However, an attempt to manage the problem can be made by dividing the problem into manageable hunks which have a cohesive girding structure.
>
> New and more sophisticated measures may have been developed during the course of longitudinal studies--This problem is a serious one. There seems to be no way to integrate new measures into an ongoing study without facing monsterous confounding variables. Observation may mitigate this problem in allowing some post hoc assessment of the child's probable performance on the task without actually administering the test. If the test really does represent a principle of development, skilled observation should reveal the use of this same principle if it was available to the child (see Gallagher, et. al., unpublished, 1973, p. 28).
>
> Expense of longitudinal research--As Sontag (1971, p. 1001) asserts, "Longitudinal "research" ...is no more expensive, time-consuming, or frustrating than cross-sectional research and it can provide continuous payoff--payoff which could be obtained in no other way."

Theoretically, at least, there seems to be sound justification for a longitudinal study; but, is a large scale study justified? The obvious merit in large scale research application is the increased room for generalization created, and this factor is very significant. Then need for preliminery research is clear and is acknowledged here. However, we have a great deal of preliminery research available, although it is not well coordinated, and a mechanism for such research is provided in the model proposed. But what if we wind up with a large scale flop--doing nothing is the same as doing anything? First, we will have gained a great deal of information about the young child. Second, we can cease to pursue a fruitless line of inquiry which would have

dragged out endlessly. There is a great deal to be gained whether the null hypothesis that X type of infant education has no effect is confirmed or disconfirmed.

Several preliminery problems must be resolved before such a large scale longitudinal study may be undertaken, though. One obvious and serious problem is the general lack of interest in or animosity toward idea of infant education. The first step needed in the establishment of any infant education program will probably be a public education program to convince people that the idea is neither ridiculous nor demonic and that needs exist which may be fulfilled by such a program. The most efficient medium of such marketing is the mass media. Such a program must be aimed at the public at large since this group is bound to foot the bill, and, therefore, it should attack the problem from both an altruistic (child's benefits) and a pragmatic (minimal harm thesis) angle. Some marketing should be directly aimed at parents. Getting money for a program is of very little use if there are no participants, and it is most unlikely that mandatory infant education will be established. It may be possible to coerce the poor parent into participation through overt bribes (money) or threats (withdrawal of welfare); however, the parent is an invaluable and essential resource in any home visitation type program and therefore must be cooperative. Furthermore, such controls are not so readily available for the middle class parent whose infant is needed for maintenance and enhancement oriented studies and for comparison groups. Family physicians and pediatricians

would also be valuable allies and every attempt should be made to elicit their support for infant education and their active involvement in the dissemination of materials and the promotion of a positive attitude toward infant education.

Other preliminary problems are related to the facilities for infant care. The importance of these problems is underscored by the fact that the type of care setting is fundamental to the definition of relevant independent variables since the type of education employed is largely dependent on this factor. Within each type of setting, an investigator could construct a research-curriculum model something like the one proposed here which is in line with his own theoretical orientation and the concomitant specific and general goals allowing the comparison of different orientations and programs in varying situations which can have both theoretical and practical impact. Three basic care settings and their concomitant potentials for both promise and problems must be considered.

Since most infants presently remain in the home, it seems logical that much infant education will take place there. Several home visitation programs have been designed and tested. It would seem feasible to attempt to implement these programs with various groups of infants (high risk groups should be defined) as a sort of large scale development research project. Such a project could define more clearly the short and long term effects of this sort of infant education and the relative efficacy of the available programs. A related home oriented tack is parent education.

The obvious difficulty with such a program is the awesome magnitude of the task. It would be both absurd and impractical to even suggest that every mother and baby in the United States be visited weekly or even monthly for two years. To fulfill the research aspect of the proposed project it will be necessary to involve a cross section of the total population and appropriate control groups. However, such research should help to identify particular subgroups which would benefit most from such intervention, and for practical and economic reasons later programs could concentrate on these target groups. This isn't to suggest that offering universal infant education is either unnecessary or untenable. The mass media could be a vehicle for infant education as well as public education and "Baby Learning Through Baby Play (Gordon, 1970)" could go coast-to-coast in full living color every morning, afternoon, and/or evening. One might even be able to get the networks to each offer a different program and pay for it--a great way to sell "pampers". Research teams could assess the skills of tv taught babies (grouped by network) relative to each other, to infants receiving other types of education, and to relevant controls. The problem here is maintaining a control group which does not have access to the program. This could be fairly well controlled by only showing the program(s) in certain areas, but the areas without the programs must be carefully matched to those with.

Along the same lines, group care programs could be implemented and tested in orphanages and group day care center (preliminary problem: few day care centers serve infants; solution: establish some). As was

stated, most infants are cared for in the home, however, with the trend toward more women entering the labor force, it would be surprising not to see an increasing demand for day care. It is this trend which offers perhaps the strongest argument for infant education research and program development, for the irreparable damage suffered by institutionalized infants and children is well documented.

A third source of infant care is the family day care home. The logical tack here would be to establish a program intermediate between the home visitation and group care programs. However, the first barrier which must be overcome in the implementation of such a program is the ivisibility of such homes in many states. More attractive benefits must be offered to induce the caregiver to become licensed (added income, nutritional and medical services, etc.).

The major need is for the establishment of a central agency (probably a federal agency under the auspices of the Office of Child Welfare of the Department of Health, Education, and Welfare) to initiate and coordinate the proposed infant education project. It would function to sell the idea of infant education; establish goals and priorities for infant education with various groups; plan and initiate research; train researchers; coordinate programs and assure as much continuity as possible; gather data; assess the relative merits of various programs; and on the basis of research formulate a proposal for future public policy. For at least two reasons it would be most desirable to have this agency composed in part of the researchers who have developed and to

various extents, tested, the existing programs. The obvious reason for this choice is that these people are the ones best qualified to modify, implement and evaluate these programs and to develop new programs. Each member of the agency could design and implement a project fitting the general framework set up by the entire committee, assuring the element of inter-program comparability which is currently lacking, and all of the projects would be reviewed by the committee as a whole, establishing an advocacy situation. Less obvious, but equally functionally elegant is the possibility of pooling their monetary as well as professional assets. Theoretically at least, one large research project costs less than ten small ones and all of the people in question probably have research funds, so that the proposed project would not be such an enormous added federal expense.

The proposed agency would also need adminstrators and advertising specialists. Since some assessment of the cost-benefit relationship is necessary and would be an asset in determining and marketing the end product (s), a group of economic advisors would be useful addition to the agency. These members could temper the decisions of the educator members. Quantification is not such a problem as it might seem, if appropriate control groups are used. Benefits are reflected by measures of developmental differences between experimental and control groups. For goals one, two, and three if members of the control groups show indication of "disadvantages" or failure to develop normally, the projected cost of later intervention programs or permanent maintenance

00063

at the public expense for an equal percentage of the experimental group could be calculated. Human resources and benefits should not be ignored, although they do not seem quantifiable. The fourth goal would probably be supported mainly on these grounds as it is difficult to say exactly how many world problems would be solved (or created) by more intelligent, better adjusted people, but if cost can be kept at the goal three level, this sort of program would provide goal three benefits and extended human benefits.

In concluding, the final and abiding caution which must always be remembered is to take care that procedures will not have adverse effects in so far as that is possible. There can be no guarantee of this, but if all indication are to the contrary, this sort of vague spectral fear must not be allowed to breed paralysis. There are risks in all things, but the only certainty in absolute conservatism is the certainty of destruction. As the wiseman assures us, this too shall pass; one can be certain only of change. Man has certain qualities of forevision. Theory most vividly depicts such episodes of human thought. However, beautiful theories are not always appropriate to current reality. Therefore, tempered by logic they may be tested by research, achieving some fit between the realities of the mind and the realities of the world.

Summary and Implications

Two major assumptions form the basis of this work: 1) infants do

learn--and fail to do so (introduction) and 2) given certain circumstances, this learning can be facilitated (Chapter 1). The second assumption is obviously dependent upon the first. Given these two global assumptions, a model (Chapter 2) may be designed for the testing of any derivative assumption such as the example used herein--that Piagetian training will facilitate learning which of course rests on the premise that Piagetian theory portrays the essence of infant learning and failure to learn. An accumulation of tests of these more specific types of assumptions inductively and deductively generates support for the original global assumptions, creating a cycle.

The initial assumption is one which may be true or false, and, as such, is rather easily dealt with. However, the second assumption may prove true or false and good or bad. Such knowledge is potentially functional and therefore, like all that is real, tied to value judgment, traditionally a very irrational process. Accepting or rejecting infant education as a social institution involves making a value judgment. My attempt in the final chapter has been to establish a mechanism for rational value judgment, in so far as that is possible.

Implications:

POLITICAL: Establishment of rational, popular, economically sound public policy regarding infant education with a sound foundation in empirical findings which can form the basis for a large scale infant education project.

HUMAN:

00065

Infant: Dependent upon the goal of the particular program involved, and its success, the infant may:

1) fail to develop deficiencies and disadvantages;

2) have lessened biological disadvantages;

3) develop normally; or

4) show enhanced growth in the aspects of development emphasized by the program.

Parent: 1) Reliable and sound assistance in caring for and educating the infant either through in home instruction in parenting and teaching skills or through having these roles partially assumed by a professional caregiver.

2) The opportunity for his child to develop soundly.

3) An opportunity to improve the economic position of the family and provide both parents with the opportunity to engage in activities outside of the home by leaving the infant in a care facility which they are assured at least will not damage the child, and may well improve him.

4) Perhaps (and in some programs) valuable gains in the parents' self-confidence and work skills.

Society: 1) Better children (or at least no worse).

2) Avoidance of developmental difficulties which might occur as a result of a rapidly increasing trend toward more women entering the labor force placing more infants in out of home care which may be inadequate for normal development or at least information about whether such difficulties are likely to arise before they do.

3) Possibility of reducing the number of people relagated to society's wastebins (i.e., prisons, institutions for retardates, etc.) entailing great human savings and, also important, monetary saving.

SCIENTIFIC: Expansion of scientific knowledge.

Failure to reject the null hypothesis (Infant education has no permanent effects) would result in the curtailment of potentially endless research in fruitless directions, which is good for science and the economy, and the avoidance of endless public spending without evaluation for a program that certainly "sounds good" and really "ought" to be good.

Appendix A

Review of Infant Education Programs

Each program is presented in terms of a number of descriptors which are essential factors in any such program and therefore may provide continuity and facilitate an examination of the similarities and dissimilarities between and among programs.

Section I

Programs with the General Goal of Preventing Disadvantages Associated with Environmental Deprivation

The Children's Center - Syracuse University

Director: Dr. Bettye Caldwell/Dr. Ronald Lally

Address: 100 Walnut Place
Syracuse, New York 13210

Goals: "To make each child maximally aware of the world around him, eager to participate in it, and confident that what he does will have some impact on it. That is, the programmed environment will attempt to develop sensory and perceptual discrimination, and orientation toward activity, and the feeling of mastery and personal accomplishment which appear so essential for the development of a favorable self-concept. (Caldwell and Richmond, 1965, p. 139)."

Stresses cognitive, motor, social and personality development.

Foundations: Piaget, Montessori, directors' prior research

Population: Number of Subjects (N) = 25
Socioeconomic Status (SES): Low
Age Range: 10 children 6 - 18 mo., 15 children 18 - 36 mo.
Control Group: Not described in available sources.

Program Type: Home visitation until the infant reaches 6 mo. of age, then group day care, available from 7 AM - 7 PM, each child spends 6 - 9 hours in the center. There is a monthly conference with parents who are encouraged to volunteer to work at the center.

Curriculum: Age appropriate activities

Feeding, bathing, and changing are used for stimulation and interaction. Thirty minutes each morning and afternoon is set aside for individual stimulation of the infant using Piagetian techniques. Several times a week concepts and abstraction are taught through "learning games." Also included are reading, art, music, rhythm, and Montessori activities.

Procedure: The infant is cared for by one adult at youngest ages, then phased into a larger group situation at around 18 mo.

Cost: $11.54 per child per day (excluding research expense)
90 per cent of the expenses reflect staff salary. Parents pay on a sliding scale.

Staff: Director
2 Educational Supervisors
2 Medical Personnel
1½ Social Workers
1½ Caretakers
4 Supportive Staff (cooks, janitor, chauffeur)

Training: Staff training not described.

Evaluation: Observation and IQ testing

Results: (Tentative - plan to follow up to 7 years)

1) Thirty to thirty-six mo., after one year of day care: no differences in emotionality, mother-child attachment, and maternal emotionality.

2) Positive relationship between the strength of the mother-child attachment and the developmental level of the child for both day care and home raised infants.

3) No relation between age of entry into day care and personal and social adjustment.

4) Significant gains in development for children entering before and after three years of age, therefore, no negative effects associated with early entry.

5) Significant gains in IQ (average 5.6 points) after a mean interval of seven months in the program.

Other Features: Sick Bay
Well Child Clinic: Each child examined regularly and immunized against contagious diseases.

Comment: This program fits in the category of those espousing the goal of prevention of disadvantages associated with low SES by virtue of the population selection. However, it also aims to maintain normal development within the day care setting, therefore also fitting under this goal category, to be discussed later.

Program References:

Caldwell, B., and Richmond, J. Programmed day care for the very young. Child Welfare, 1965, 44, 134-142.

Horowitz, F., and Paden, L. The effectiveness of environmental intervention programs. In B. Caldwell and H. Ricciuti (Eds.) Review of child development research, vol. 3. Chicago: University of Chicago press, 1973, 331-402.

The Florida Parent Education Program - University of Florida

Director: Dr. Ira Gordon

Address: Institute for Development of Human Resources
College of Education
University of Florida
Gainsville, Florida 32601

Goals: To influence the general development of the infant by training nonprofessionals to teach parents to be effective teachers of their children and provide important stimulation.

Foundations: "...Research indicates that the major source of a student's pattern of achievement as well as his personality structure is the home in which he grows up (Gordon, 1974, p. 1)."

Population: N = 95
SES: Low
Age Range: 3 - 36 mo.

Program Type: Home visitation, parent education emphasis, with Home Learning Center experience for members of certain groups beginning at 24 mo.

Curriculum: Planned learning experiences

Procedure: Low income women were trained to teach mothers to stimulate their infants. The parent educator enters the home weekly for about an hour and demonstrates learning experiences with a doll. The mother imitates her actions with the infant.

Experimental Design:

GROUP	3 - 12 mo.	12 - 24 mo.	24 - 36 mo.	48,60,72
1. E	HV	HV	HCL/HV	Test
2. EE/C	HV	HV	C	Test
3. C/EE	C	HV	HCL/HV	Test
4. E/C/E	HV	C	HCL/HV	Test
5. E/CC	HV	C	C	Test
6. C/E/C	C	HV	C	Test
7. C/C/E	C	C	HCL/HV	Test
8. C	C	C	C	Test

(Gordon, 1973, p. 4)

Cost: $300.00 - 400.00 per child per year. Funded through HEW and National Institute of Mental Health.

Staff: Director and parent educators

Training: Parent Educator--
High school graduate, unemployed or underemployed, experience with infants, majority black, paid $3,000 - 4,000 per year.

Receive 5 week course before visits and once a week in-service training program. Curriculum: stimulation tasks, interview techinques, record keeping, observation procedures, and information on child development.

Evaluation:

GROUP	3 mo.	12		36
E and C		Griffith Scales	Bayley Langauge TOB	S-B* TOB* Leiter PPVT*
E only			Weld* SEMS*	Language

GROUP	48 mo.	60	72
E and C	S-B TOB Leiter PPVT	S-B TOB PI PPVT	S-B TOB PI PPVT

MOTHERS

GROUP	3 mo.	12	24	36
E and C	SRI* HISM*	SRI HISM Lang. Demo.	Interview HISM Lang. Demo.	Interview Language Demographic
E only	PEWR*	PEWR	PEWR	PEWR

GROUP	48 mo.	60	72
E and C	Interview	Interview	Home Interview

(Gordon, 1973, p. 6)

*S-B: Stanford-Binet
TOB: Task Oriented Behavior
PPVT: Peabody Picture Vocabulary Test
Weld: situational event sampling procedure of child behavior
SEMS: Scott Effectiveness Motivation Scale
SRI: Social Reaction Inventory
HISM: How I See Myself
PEWR: Parent Educator Weekly Report

Results:

1) At the end of the first year, children who entered the project at three months of age were developmentally superior to children whose mothers did not receive training.
2) After two years, children who entered the project at the age of three mo. or 12 mo. and whose mothers were correspondingly trained for 2 or 1 years were superior to controls in terms of developmental test scores and series materials.
3) Children who entered the project at 3 mo. and whose mothers received only 9 mo. of training were no longer superior to the control group at the end of 2 years.
4) Evidence that mothers improved in terms of personal adequacy (Horowitz and Paden, 1973, p. 351).

Program References:

Gordon, I. The Florida parent education early intervention projects: A longitudinal look. Modified from a paper presented at the Merrill-Palmer Conference on Research and Teaching of Infant Development, Detroit, Mich., Feb. 8, 1973.

Gordon, I. Greenwood, G., Ware, W., and Olmsted, P. The Florida parent education follow through program. Gainesville, Florida: Institute for Development of Human Resources, Jan., 1974.

Horowitz, F. and Paden, L. The effectiveness of environmental intervention programs. In B. Caldwell and H. Ricciuti (Eds.) Review of child development research, vol. 3. Chicago: The University of Chicago Press, 1973, 331-402.

Programs for infants and young children, part 1: Education and day care. Washington, D.C.: The Appalachian Regional Commission, Oct., 1970.

Infant Education Research Project

Director: Dr. Earl S. Schaefer

Address: 5454 Wisconsin Avenue
Chevy Chase, Maryland 20203

Goals: To provide intellectual and verbal stimulation to disadvantaged infants from the time the child is 15 months old until he is three years old.

Foundations:
1) Studies of intellectual development have found differences in mean mental test scores of infants from different social classes and from different races up to 15 - 18 mo., but by the age of 3 years large differences between groups have emerged.
2) Studies show that measures of intellectual level correlate highly with verbal ability as measured by tests of vocabulary and information tests and culturally deprived groups and bilingual groups are more retarded on these verbal tests than on nonverbal tests of intellectual ability.
3) Lower SES groups get less verbal stimulation at home, and parents are less adequate language models (Schaefer, 1970, pp. 2 - 3).

Population:
N = 28
SES: Low
Age Range: 15 - 36 mo.
Race: Negro
Selection Criteria:
1. Mother had less than 12 years of education.
2. Mother unskilled or semi-skilled.
3. Family income under $5,000.00.
4. No serious sensory or neurological problems.
5. Relatively stable home.

Control Group: Same Criteria. N = 30

Program Type: Home Visitation

Curriculum: Sequence largely evolutionary rather than pre-specified. Activities: talk to the child; show pictures; teach vocabulary; play games; read; color; do puzzles. Instructor proceeds from the familiar to the novel. Maternal participation is encouraged.

Procedure: The children were individually instructed by a trained tutor for one hour per day, five days a week, in the child's home. Each tutor has two sessions in the morning and two in the afternoon and works with alternative groups of four children to avoid potential turnover problems. Each tutor also had a conference with an educational supervisor daily. Each child served continuously, receiving 340 hours of tutoring, or 16 hours per month for 21 months. Tutors also met with an educational supervisor in weekly two hour group sessions. Parents were paid $1.00 per tutoring session and $10.00 per testing session.

Cost: Cost was not specified, but the budget is available.

Project Director	Half-time
Project Supervisor	Full-time
Educational Supervisor	Full-time
Tutors, one for every four children	Full-time
Testers	$25 per child
Project Secretary	Full-time
Books and Materials	$32 per child
Office Materials	$750 per yr.
Reimbursement of Parents	Session: $1 Test: $10
Office Rental	
Local Travel	

Staff: See budget

Training: Tutors: 2 - 3 mo. training: ½ time training activities. ½ lectures, field trips to institutions, and 2 week pilot case. Emphasis on the "three needs of the culturally disadvantaged child:" need for positive relationships with other persons; need for varied stimulation; need for verbal development. College degree required.

Evaluation:

14 mo. (pretest):	Bayley Infant Scales of Development
21 mo. (retest):	Bayley Infant Scales of Development
27 mo. (test):	Stanford-Binet
36 mo. (test):	Stanford-Binet; Peabody Picture Vocabulary Test; John H. [illegible]ns Perceptual Test; Aaronson [illegible] Schaefer Preposition Test (i.e., magnetic board with three objects).

Results: Pretest: experimentals were not superior to controls--slightly lower, though not significantly so.
Tests: Experimental group grew progressively superior to controls. Tutor ratings of parent behavior were correlated with achievement.

Other Features: Modifications/Suggestions

1) Neighborhood Learning Centers with high school girls and mothers responsible for tutoring (high level of formal education needed for initial research only).
2) Reduce research and administrative personnel to one educational supervisor, one secretary, and one field supervisor for each 12 tutors.
3) Begin when the infant is 6 mo. for optimum efficacy.

Program References:

Horowitz, F. and Paden, L. The effectiveness of environmental intervention programs. In B. Caldwell and H. Ricciuti (Eds.) Review of child development research, vol. 3. Chicago: University of Chicago Press, 1973, 331-402.

Schaefer, E. S. The infant education research project in Washington, D.C. Washington, D.C.: U.S. Printing Office, 1970.

The Milwaukee Project--Infant Intervention Program

Director: Dr. Rick Heber

Address: Waisman Center on Mental Retardation and Human Development
University of Wisconsin
Madison, Wisconsin 53705

Goals: For Mothers:
"...to prepare the mother for employment opportunities, as well as improve their homemaking skills and child-rearing skills (Heber et. al., 1972, pp. 11-12)...

For Infants:
provide an environment and set of experiences which would allow the child to develop his potential intellectually as well as socially, emotionally, and physically.

Foundations: For Maternal Rehabilitation Program:
1) The mother is the principal teacher of behavioral skills.
2) Prior knowledge suggested that fathers would be absent in about one third of the families.

For Infant Intervention Program:
"By the time a child is two years old, he has begun to communicate, he actively explores, manipulates, and gives order to his environment...Recent research in infancy has demonstrated that children learn simple tasks (Lipsitt, 1967) and even indicate preferences (Fantz, 1967) within the first few weeks of life. Studies of the depressing effects of early severe deprivation and normal development, coupled with knowledge about the early and rapid growth which occurs during this period, would justify conceptualizing infancy as a time when the foundations of learning are laid (Heber, et. al., 1972, p. 19)."

UNDERLYING RATIONALE OF THE PROGRAM

"Three per cent of the total population is classified as mentally retarded. Eighty per cent of all mentally retarded people show no identifiable gross central nervous system pathology and are classified as cultural-familial retardates. These persons are

found almost exclusively among populations of economically depressed urban and rural areas. The degree of retardation is usually mild (IQ 50-75). A survey of the residential Milwaukee area with the lowest median family income; greatest rate of delapidated housing; and the greatest population density per living unit showed that the variable of maternal intelligence was the best single predictor of low IQ in offspring and decline with increasing age (Heber, et. al., 1972, pp. 1-9)."

Population: N = 20
SES: Low
Age Range: 3 mo. - 2 yr.
Selection Criterion: Maternal IQ less than 75
Control Group: Matched to experimental group

Program Type: parent education, home visitation, and day care

Curriculum:
Mothers: Basic academic skills and in service training in laundry work, housekeeping, food service, or nursing (aide).
Infants: Divided into two main areas: perceptual-motor and cognitive-language. Experiences, activities, and goals are defined within each area. Physical care and instructional activities are not sharply separated.

Procedure:
Mothers: Phase I: adult education classes
Phase II: occupational training program
Infants: The teacher went to the home of her infant, observed, and gradually took over care. When the mother felt confident, she gave permission for the infant to be brought to the learning center where the teacher-child ratio remains 1:1 until the infant is 1 yr. old when two teachers share two infants, then at fifteen months two infants share one teacher. Each infant and teacher share a small area which has the child's crib, a comfortable chair for the teacher, a feeding table, and a small number of manipulative toys. A large gross motorroom with toys is shared with other infants of similar age. At 10 mo. the children begin to eat together and at 15 mo. their cribs are placed in the same room.

Cost: Not Given - undoubtedly quite high

Staff: Teachers are paraprofessionals from the neighborhood
Education range from 10th grade to M.S.
Director
Teacher Supervisor
Curriculum Coordinator
Parent Supervisor

Training: Teachers:
Formal Instruction: biweekly group meetings
Inservice Training: observed and evaluated by curriculum coordinator and supervisor who help with planning. Also, there are meetings, video tape sessions, and self-evaluations.
Annual Seminars: 3 days per year.

Evaluation: Physical development - height and weight
Gesell developmental schedule
Gross feature tabulation of free speech sample
Stanford-Binet
Developmental Checklist
WPPSI

Results: Mothers:
All but one of 20 were rated as employable following training. It was not possible to objectively assess in-home behavior changes.
Infants:
1) No significant differences in height and weight relative to a matched control group
2) On the motor, adaptive, personal-social, and language scales of the Gesell:
   a) The two groups were comparable at 6, 10, and 14 mo.
   b) At 18 mo. the controls were 3 - 4 mo. behind.
   c) At 22 mo. the controls were 4.6 - 6.1 mo. behind.
3) Language: Members of the experimental group were more verbal until 30 mo., then there was no significant difference between groups. E's produced less repetitive sentences and more morphemes and showed larger vocabularies.
4) Stanford-Binet
   At 36 mo.: 30 point difference At 60 mo.: 26 pt
   At 48 mo.: 31 point difference At 66 mo.: 30 pt

5) WPPSI: consistent differential performance, although less difference than found on the Stanford-Binet.

Other Features: The program continues until 6 years of age. Results are tentative.

Program References:

Heber, R., Garber, H., Harrington, S., Hoffman, C., and Falender, C. Rehabilitation of families at risk for mental retardation. Madison, Wisc.: University of Wisconsin, Dec., 1972.

Horowitz, F. and Paden, L. The effectiveness of environmental intervention programs. In B. Caldwell and H. Ricciuti (Eds.) Review of child development research, vol. 3. Chicago: University of Chicago Press, 1973, 331-402.

Mother's Training Program - University of Illinois

Director: Dr. Merle Karnes

Address: Institute for Research on Exceptional Children
Department of Special Education
403 East Healy Street
Champaign, Illinois 60682

Goals:
1) To train mothers to be effective teachers of their children.
2) Emphasize the child's cognitive and verbal development.

Foundations:
1) The mother is the chief teacher of her child and can be made more effective leading to the prevention of learning deficits in children and fostering dignity and worth in the mother through self-help.
2) Tutors are an unpractical expense.
3) Painter's work at the University of Illinois.

Population: N = 15, 5 female, 10 male
SES: Low
Age Range: 13 - 27 mo. at outset
Control: 1) 15 infants with similar backgrounds.
2) 6 older siblings for whom test scores were available at similar CA's prior to mother's enrollment. To control for the variable of maternal motivation.

Program Type: Parent Education

Curriculum:
1) Training mothers to use educational toys, books, and materials to stimulate their infants.
2) Discussion of problems related to child rearing in today's society.
3) Fostering attitude change through sharing ideas with each other as a group.
4) Development of a sense of responsibility for themselves, their families, and the community in which they live (Badger, Unpublished, Undated, p 2).

Activities taught for infants:

1) Following directions

Graduated Rings	Nested boxes
Snap beads	Object lotto game
Stringing Beads	

2) Problem solving

Form box
Shapes, colors, and sizes
Wooden In-Lay puzzles (3 - 12 pieces)

3) Fun (non-structured play)

Pounding bench
Busy box
Music ball
Crayons, Scissors, Play dough, Slate and chalk
Blocks
Learning tower (Badger, unpubl, pp.

Procedure: Mothers attend a two hour meeting each week. They are paid $1.50 per hour for babysitting expenses. Transportation is provided. The mothers are instructed in teaching teachniques which they agree to apply daily at home with no pay. Toys are given to the babies. The infants are tested monthly. Monthly visits were made to the home (more frequently if necessary) for professional help and corrective feedback.

Cost:

Pay to mothers	$1,500.00
Toys/materials	1,000.00
Staff	7,500.00
	$10,000.00 total for 20 mothers

Staff: 2 half-time employees--one to lead mother groups, one to take notes and make home visits.

Training: Not described

Evaluation: Infants: ITPA and Stanford-Binet

Mothers:
1) attendance records of the meetings.

2) attitude changes which the staff regularly observe.
3) subjective evaluation of mothers and the interest of the babies as observed in working with them at home.
4) mother's response to the project evaluation questionnaire given at the end of the first year.
5) commitment of mothers to the program goals.

Results:

Mothers:
indications that the program was a success
1) positive responses to questionnaire
2) 100 per cent participation in the second year by first year mothers.

Infants:
Matched Control Comparison

Stanford-Binet: mean Binet of tutored children 16 points above control IQ average.

ITPA: The experimental group performance closely approximated its mean CA; control averaged six months below their CA. "Since 7 of 15 control subjects scored below the normative range of the test total and were arbitrarily assigned the lowest normative age score, the mean of this group is artifically inflated (Karnes et. al., unpublished, p. 4)."

Sibling Control Comparison

"Greater differences in intellectual functioning and language development were found between the experimental group and their siblings than between the matched groups (Karnes et. al., unpublished, p. 4)."

S-B: significant 20 point difference between groups. virtually no overlap in IQ range: E: 99 - 134 C: 71 - 102. 3 of 6 in E groupscored above 124.

ITPA: E group showed mean acceleration of 3 mo.; C group almost 4 mo. below.

Program References:

Badger, E. Mother's training program: Educational intervention by mothers of disadvantaged infants. Unpublished paper, undated.

Karnes, M., Teska, J., Hodgins, A., and Badger, E. Educational intervention by mothers of disadvantaged infants. Child Development, 1970, 41, 925-935.

Ypsilanti Carnegie Infant Education Project

Director: Dr. Delores Lambie

Address: High/Scope Educational Research Foundation
125 N. Huron Street
Ypsilanti, Michigan 48197

Goals:
1) Aid the infant's cognitive, motor, and language development.
2) Aid mother in her role as teacher.
3) Assess the effectiveness of systematic intervention by public school teachers, starting at infancy in preventing intellectual deficits commonly found in children from disadvantaged populations.

Foundation:
1) Success of similar method in preschool projects.
2) Piagetian view of the infant and the nature of learning.
3) "...Parents play a vital role in the rearing of their own children and ...are capable of effective child rearing when provided with resources and adequate to the task (Lambie et. al., 1974, p 2)."

Population:

Original Sample

	E group	Contrast	Control
Cohort 1	10 (5/5)	11 (4/7)	8 (5/3)
Cohort 2	12 (7/5)	11 (5/6)	11 (5/6)
Cohort 3	9 (3/6)	8 (3/5)	8 (4/4)

Boy-girl ratio are in parentheses
Overall = 41/47

Final Sample

	E group	Contrast	Control
Cohort 1	9 (4/5)	10 (3/7)	4 (2/2)
Cohort 2	7 (2/5)	7 (4/3)	10 (5/5)
Cohort 3	6 (3/3)	4 (0/4)	8 (4/4)

Overall = 27/38
(Lambie, et. al., 1974, p. 7)

Selection Criteria:
1) Infant 3, 7, or 11 mo. at age of entry.
2) Low SES.

Program Type: home visitation, varied for three groups: experimental contrast, and control.

Experimental Group:

Curriculum - Provides (quote)

- A view of the child and a model of his development.
- A set of developmental objectives (" expectations") for the child are related to his current developmental status rather than CA.
- Basic information about the processes of learning and development which facilitates interpretation of child-initiated activity and child-response to teaching stimulation.
- Insights into the environmental conditions and child-environment interactions requisite to development.
- Criteria for assessing the effectiveness of teaching activities.
- Objectives and strategies for communicating with the mother in order to involve her more effectively as a teacher of her child.

(Lambie, et. al., 1974, p. 14)

Procedure - Professional teacher entered the home once a week for 60 - 90 minutes. 50 visits were completed in the 16 mo. period of the study.

Cost: Not specified; Carnegie Corporation Funding

Staff and training:

Represent a variety of professions in child care and development. Specializations in child psychology, play therapy, early education, and work with parents in social groups. Staff also included a psychologist, linguist, research assistant, and a child development specialist.

Contrast Group:

Curriculum--No formal curriculum

Procedure--A volunteer was to meet with the mother and infant on the same basis as the professionals dealing with the experimental group.

The same general pattern was followed, but missing weekly visits was for more frequent. The volunteers were to attend weekly discussions and keep a record of activities with the infant and record general information regarding the visit. Their function was to serve as a control for the possible effects of the child receiving attention from adults outside of the family. Attrition of families in this group became so great that the volunteers were replaced by community representatives.

Staff: Volunteers: mostly females, college students interested in, but not trained in infant development.
Community Representatives

Control Group

Procedure: Infants and their mothers were seen every four months in the home for data collection. Techniques were identical to those employed with the other two groups.

Evaluation: Bayley Scales of Infant Development and S-B
Verbal Interaction Record (VIR - mother rating)
Observation

Results: Infants:
Cognitive

1) Experimental group subjects' (E's) significantly higher on Bayley Mental than contrasts and somewhat though not significantly higher than the controls.
2) None of the treatment groups showed below average Binet scores at the one year follow up.
3) One year follow up S-B scores not significantly different, although there were stable relationships among group means with E highest, Contrast next, and Control lowest.
4) E's showed greater stability in test results.
5) The experimental group showed no effect for age of entry.

Language
1) E's significantly more sophisticated in production, comprehension, and effective communication by the end of the project.
2) No age of entry effect.

Motor
No significant differences.

Socio-emotional
Children in the experimental group were judged more responsive to persons and to show more imaginative play. However, given the large number of predicted results which did not prove significant, these findings may have occurred by chance.

Sex Differences
None

Mothers:
VIR: Much higher scores for experimental mothers.

Maternal perception and expectations for child development did not differ by group as measured by the Ypsilanti Picture Sorting Inventory.

Mothers were observed to become more observant, provide more play materials, support the child's activities, increase their interest in education, assume the child's point of view, and enjoy their interactions with their infants more after the intervention program.

Program References:

The High/Scope cognitive preschool curriculum: An open framework. Ypsilanti, Mich.: High/Scope Educational Research Foundation, 1974.

Horowitz, F. and Paden, L. The effectiveness of environmental intervention programs. In B. Caldwell and H. Ricciuti (Eds.) Review of child development research, vol. 3. Chicago: University of Chicago Press, 1973, 331-402.

Lambie, D., J. Bond, and D. Weikart. Summary of final report of Ypsilanti Carnegie infant education project. Ypsilanti, Mich.: High/Scope Educational Research Foundation, 1974.

Weikart, D. and D. Lambie. Early enrichment in infants, In V. Denenberg (Ed.), Education of the infant and young child. New York: Academic Press, Inc., 1970, 85-109.

Section II

Programs with the General Goal of Remediating Diagnosed Disadvantages

Early Intervention with Biologically Handicapped Infants and Young Children

Investigators: Drs. Maria Barrera, Donald Routh, Nancy Johnson, Carol Parr, Elaine Goolsby, and Stephan Schroeder

Address: Child Development Institute
University of North Carolina
Chapel Hill, North Carolina 27514

Goals: To provide treatment in the areas of gross motor skills, fine motor skills, language, perceptual-cognitive abilities, and personal-social training.

Foundations:
1) Bloom
2) "...A good day care program for handicapped infants and toddlers can enrich the immediate quality of their lives, give parents a break from the burden of full time care, and provide training opportunities for students...(Barrera et. al., unpublished, p. 1)."

Population: N = 10
Age Range: 13 - 48 mo.
Selection Criterion: Must have a biologically based developmental handicap.

Program Type: day care and home visitation

Curriculum: Composed of activities in each of the five general areas defined as goals. Activities are derived from other sources.

Procedure: The infant must be diagnosed to have a biologically based handicap. Each child is evaluated in the five areas. Individually tailored treatment is given in the area of greatest difficulty. Two of the remaining four areas are randomly selected for initial

emphasis. After a stated interval, treatment in the original optimal areas is dropped and replaced by emphasis on the remaining two areas.

Home visitation concentrates on the parents. Social, personal, and marital counseling are available. Parents are taught how to use activities, and basic principles of learning and are given practice in developing their own treatment programs.

Cost: Not given.

Staff: Physical therapist, nurse, speech pathologist, and a psychologist to work with the children. Social worker for parents.

Training: Traditional academic

Evaluation: Memphis Comprehensive Developmental Scale

Results: None reported.

Program References:

Barrera, M., Routh, D., Johnson, N., Parr, C., Goolsby, E. and Schroeder, S. Early intervention with biologically handicapped infants and young children: A preliminary study using multiple baseline procedures. Chapel Hill, N.C.: The Child Development Institute, undated.

Programs for Down's Syndrome Children - The Infant Learning Class

Directors: Dr. Alice Hayden and Dr. Norris Haring

Address: Model Preschool Center
Experimental Education Unit
Child Development and Mental Retardation Center
University of Washington
Seattle, Washington 98105

Goals: "...To promote the children's development of gross and fine motor skills, as well as social, communication, cognitive, and self-help skills, so that their development more nearly approximates the sequential development of normal children (Hayden and Haring, unpublished, p. 52)."

Foundations: Denver Developmental Scale

Population: N = 20
Age Range: 5 weeks to 18 mo.
Selection Criterion: standard trisomy 21 anomaly, mosaic anomaly, or chromosomal translocation

Program Type: Parent Education, Professional intervention with the infant, and optional home visits.

Curriculum: Training goals are based on the Denver Developmental Screening Test and the developmental norms of Gesell and Amatruda (1969). Evaluation is criterion referenced.

Example: Goals for 18 mo. with accuracy of 80 - 100%
1. sit without support
2. stand for five minutes with support
3. reach, grasp, hold, and release objects on cue

Procedure: Parents and infants receive thirty minutes of individualized training at the center each week. Parents report their observations of the infant's behavior. Attempts are made to establish an interactive relationship. If requested by parents, a student will make home visits.

Cost: Not given

00090

Staff: One head teacher
One assistant teacher
Mothers serve as observers, data takers, or teachers' aides once a week
Students serve as aides and observers

Training: Traditional academic; in service for mothers

Evaluation: Gesell norms, assessed twice a year
Denver norms, once a month
Down's Syndrome Assessment Form, weekly
Observation, daily

Results:
1) All the infants (1972 - 1973) met and maintained developmental objectives for their age.
2) Four infants were above age level.
3) Infants showed a mean difference of one month between CA and MA scores.

Other Features: This program is in conjunction with two preschool programs and one kindergarten program. Although the achievement of norms seen in the infant program is not maintained, the Down's Syndrome child in the program keeps up much better than does his untutored counterpart.

Program Reference: Hayden, A. and Haring, N. Early intervention for high risk infants and young children: Programs for Down's Syndrome at the University of Washington, unpublished paper, undated.

The Infant, Toddler, and Preschool Research Project

Directors: Drs. William and Diane Bricker

Address: Institute on Mental Retardation and Intellectual Development
George Peabody College
Nashville, Tenn. 37203

Goals:
1) The creation of individual programs to develop the child's competancies in the areas of gross motor skills, fine motor skills, sensorimotor skills, self-help skills, and social skills.
2) The operationalization and empirical validation of such Piagetian concepts as causality, means-end, object permanence, imitation, and functional usage.
3) The development of a library of video tapes of infant behavior to be used for research, teaching, and parent training.
4) To provide each child with certain prerequisite forms of behavior necessary for adaptive functioning in the toddler unit.

(Bricker and Bricker, et. al., unpublished, 1974, p. 29)

Foundations:
1) Piaget
2) Behavior Modification

Population: N = 20 to 23
Developmental Level: 3 to 18 mo.
Characteristics: Majority biologically handicapped, others high risk. All show signs of delay.

Program Type: Day care, all day, half day, or once a week.

Curriculum: Includes activities to involve parents, but this is not always possible. Typical intervention periods run from three to five minutes and are followed by rest or free play.

Cost: Not given

Staff: Teachers and students in related fields

Training: Traditional academic

Evaluation: Initial Assessment: Idiosyncratic and nonstandardized (Bricker and Bricker, et. al., unpublished, p. 29)."
Observation
Bayley Scales of Infant Development
Cattell Infant Intelligence Scale
The latter two devices are used "periodically" to cross validate other techniques.

Results: "Although our population seems to be thriving both affectively and educationally, many of these children are far from being acceptable or capable of fitting into the mainstream of community existence (Bricker and Bricker, et. al., unpublished, p. 50)."
No empirical program effects are presented.

Other Features: The program is continuing (toddler and preschool units). Also, it contains a research component to test certain Piagetian assumptions.

Program References:

Bricker, D. and Bricker, W. Infant, toddler, and preschool research and intervention project: Report, year III. Nashville, Tenn.: George Peabody College, 1973.

Bricker, W. and Bricker, D. in collaboration with G. Chatelanat, R. Iacino, L. Dennison, J. Filler, R. Smith, and L. Vincent-Smith. The infant, toddler, and preschool research and intervention project. Paper presented at the Conference on Early Intervention for High Risk Infants and young Children at Chapel Hill, N.C., May 5 - 8, 1974.

A Nationally Organized Collaborative Project to Provide Comprehensive Service to Handicapped Infants and their Families

Director: Dr. Una Haynes

Address: United Cerebral Palsy Association, Inc.
66 East 84th Street
New York, New York 10028

Goals:
1) To pool knowledge, skills and experience.
2) To define what the infant should learn in the first year of life and in the second.
3) To strengthen the role of the family as primary teacher and caretaker.
4) To develop a model.
5) To increase team effectiveness in the design and implementation of service programs.
6) To desseminate information

Foundations: Piaget and Skinner

Program: The program began with five centers and has added 19 more since 1971. An example of one of the centers is described here.

Population: Infants with demonstrable retardation, usually associated with cerebral palsy.

Program Type: Day care, home visitation, parent education

Curriculum:
1) Parent-child group teaching sessions
2) Parent-child individual teaching sessions
3) Child-centered individual teaching and/or therapy
4) Child centered group teaching sessions

Procedure: The morning session begins with parent-child group teaching sessions conducted by the teacher with the assistance of appropriate professionals. This part of the program lasts from 20 - 30 minutes. Immediately following this, parent-child pairs see a staff member for individual sessions. Parents then bathroom and wash the children and leave the room. Child-centered activities follow. After lunch, the parents return and have brief discussions with the staff before taking the children home.

00091

Cost:	Not given. Federal Funding
Staff:	Coordinator: physical therapist, MPH Early Childhood Developmental Specialist: M.Ed. Home Visitor: Special Ed. and MPH Occupational therapist: B.S. Nurse: B.S. and R.N. Parent Counsellor: M.S. in special ed. Speech and Hearing clinician: B.A.A. working on M.A. 2 Psycholgoists: B.A. working on M.A. 2 Teachers' Aides: 1 B.S., 1 high school grad. 1 Secretary 1 Pediatrician Program Director: Ph.D.
Training:	See staff
Evaluation Results:	"...there are no procedures for formal evaluation (Haynes, unpublished, p. 32). Intuitive assessment seems to indicate that positive things are happening.
Program References:	Haynes, U. A nationally organized collaborative project to provide comprehensive services to handicapped infants and their families. New York: United Cerebral Palsy Association, Inc., April, 1974.

Section III

A Program with the General Goal of Maintaining Normal Development in the Day Care Setting

Demonstration Project in Group Care

Director: Dr. Mary E. Keister

Address: University of North Carolina
Greensboro, N.C. 27412

Goal: To provide a model day care center which is patterned after the good home and the good nursery school and avoids the ill effects of potential damage as a result of such institutionalization.

Foundations:
1) The model of the bad institution.
2) The model of the good home.
3) The model of the good nursery school.

Population: N = 20 - 30
Age Range: 0 - 2 yr.
Criterion: Normal, healthy

Program Type: Day Care

Curriculum: There is no planned stimulation, but attempts are made to provide the following elements of the good life (Keister, 1969)

1) smooth transition from home to center.
2) continuity in caretaker.
3) planned consistency in care.
4) pride of staff in the development of the child's skills.
5) sense of belonging.
6) individual attention at feeding, bathing, etc.
7) toilet training.
8) health care and protection.
9) sick bay.
10) good play environment.
11) parental trust and security.

00096

Procedure: Infants under 18 mo. are cared for in small rooms designed for five infants and under the supervision of one caretaker. The ratio of children to staff then 1:6.

Cost:

For 20 children:	$2,420.00	per child per year
	48.50	per child per week
For 30 children:	1,973.00	per child per year
	39.00	per child per week

Staff:
Director
Nurse/teacher
Nursery Assistants
Cook
Janitor (half-time)

Training: Not described

Evaluation:
Physical development: height and weight
Physical health: parent interview
Mental development: Bayley Scales
Motor development: Bayley Scales
Personality development: role playing
Social development: Vineland Social Maturity Scale
Preschool Attainment Record

Results: There were no significant differences between the day care infants and a home raised control group on any measures except the Bayley Scale of Mental Development and the Preschool Attainment Record. On both of these measures the performance of the day care infants was significantly higher than that of the control (at .02 and .04 levels respectively).

Program References:

Keister, M. The good life for infants and toddlers, Washington, D.C.: National Association for the Education of Young Children (NAEYC) Publications, 1970.

Keister, M. Final report: A demonstration project for group care of infants and toddlers (1967 - 1970). Greensboro, N.C.: The Infant Care Program. 1970.

Section IV

A Program with the General Goal of Enhancing the Development of Normal Infants

Teach Your Baby

Director: Dr. Genevieve Painter

Address: Previously at: University of Illinois
Department of Special Education
403 East Healy Street
Champaign, Illinois 60682

Goals: Facilitation of intellectual and language development.

Foundations: "Psychological principles of infant development... (Painter, 1971, 13)." Seems to have Piagetian orientation.

Program Type: Home Visitation

Curriculum: Use of senses
Use of body, especially hands
Use of language
Problem solving skills
Picture comprehension

Population: N = 15
Age Range: 8 - 24 mo.
Criteria: Normal, Healthy
Control: Matched, N = 15

Procedure: Experiment I: professional tutor entered the child's home for one hour a day for a year.
Experiment II: mothers were trained in educational activities and child rearing methods used by professional teachers the year previous (experiment I). Professionals made check up visits to the home.

Cost: Not given.

Staff: Director
2 professional teachers

Training: Professionals: traditional academic
Mothers: formal instruction and in-service.

Evaluation: IQ testing, pre and post

Results: Experiment I: The experimental group averaged 10 IQ points over the control group, which constitutes a significant difference.
Experiment II: The experimental group averaged 16 IQ points higher than the control, again, a significant difference.

Other Features: The program was employed in the Parent-Child Center at Mt. Carmel, Ill. in 1968 - 1969 with 20 (10E, 10C) infants who were younger siblings of four year olds enrolled in a preschool program for "culturally disadvantaged" children. The professional teacher scheme was used. At the end of a year IQ scores for the E group were consistently higher, though not significantly so in all instances, than those of the control group (Horowitz and Paden, 1973, pp. 352-353). This may indicate that "culturally disadvantaged" infants do indeed require special, perhaps more intense, stimulation.

Program References:

Horowitz, F. and Paden, L. The effectiveness of environmental intervention programs. In B. Caldwell and H. Ricciuti (Eds.) Review of child development research, vol. 3. Chicago: University of Chicago Press, 1973, 331-402.

Painter, G. Teach your baby. New York: Simon and Schuster, 1971.

Appendix B

Outlines of Piaget's Work in Sensorimotor Development

Section I

Observations and Experiments by Stage

This table lists the observations reported by Piaget (1952) by stages and in the order in which they are reported. The numbers in the left margin are to assist in the location of the observation for reference purposes. Thus, the table serves as a sort of index for the observer providing concise synopsyes of observations to facilitate location of the entire observation for comparison and analysis of new and similar observations and to suggest any stage-relevant experiments and circumstances for observation.

Stage I

25 1. observe sucking and ease of adaptation in first few days after birth.

2. child voluntarily holds bottle in mouth.

3. child seeks bottle when lost. record accuracy.

4. practice sucking.

5. use of substitutes for sucking - hand, blanket, etc. note how soon the substitute is lost as an indication of coordination.

26 6. adult crooked finger as substitute.

7. check for variations in search efficiency due to body position - back, side, stomach.

8. observe affect is practice like a real situation?

9. infant's finger on cheek results in search behavior.

27 10. infant sleeping - contact with teguments results in sucking with eyes still closed, failure, awakening, and searching with attempts increasingly localized.

11. place child's hand on mouth; remove before begins to suck; observe empty sucking.

28 12. observe differences in adaptation due to degree of hunger.

Stage II

A. Acquired sucking habits

50 1. practice sucking - affect defines real search for food.

2. tongue play.

3. mouth exercises.

4. thumb sucking.

51 5. saliva play.

6. self-imposed immobilization of body to maintain hand.

7. placed in vertical (nursing) position.

a. calms, tries to suck

b. arms approach mouth

c. thumb leaves mouth, child cries

d. arms approach mouth; begin connection of arm movement and sucking.

8. body position and thumb sucking relationship.

54 9. specialization of habit - thumb sucking to assuage hunger and put to sleep.

10. body position and breast seeking behavior.

60 11. vision and sucking - see bottle, open mouth; see spoon open mouth differently.

B. Vision - for the sake of looking, not to see or act (75)

62 Perception of light exists from birth; rest acquired.

1. follow match in dimly lit room.

2. rediscover object when it escapes.

64 3. stops crying with visual stimulation.

4. visual exploration when held in vertical position.

68 5. looking at faces.

6. alternate glances.

70 7. play.

72 8. smiling - associated with particular people, movement, sounds.

C. Phonation and Hearing - simple accommodation of head to direction of sound.

78 1. crying differentiated.

2. playing with voice, babbling.

3. vocal imitation.

4. coughing.

81 5. turn head toward sound (localize).

D. Prehension

90 1. impulsive movements and pure reflexes

a. grasps and immediately relinquishes adult finger.

b. grasps accidently and reveals interest (P. inserts finger in child's hand.

2. first circular reaction related to hand movements, prior to any actual coordination between prehension and sucking or vision.

a. hand play

b. hand seems to be stimulated by contact with an object (beginning of accommodation but comes and goes instead of remaining immobile.)

c. child holds objects.

d. scratch, try to grasp, repeat; precursor of grasping; play.

e. rub eye, pull at face.

f. looking at hands.

3. coordination between prehension and sucking.

99 a. child grasps objects and puts into mouth; conjunction of two schemas.

100 b. child puts object in mouth; single act.

102 c. influence of vision on hand movements - hand play with watching the hand open, close, and move

103 d. child maintains hand in the visual field more or less successfully.

105 e. Experimenter grabs child's hand which is out of his visual field. child tries to free the hand but does not look in its direction.

106 f. Laurent learns to grasp via the schema of joining hands.

g. vision, prehension, and sucking combine.

4. prehension occurs as soon as the child simultaneously perceives his hand and the desired object.

110 a. place watch before child's eyes, arms move; place in outstretched (nonvisible) hand, no response; place before eyes, child waves hand, strikes, adjusts, grasps.

b. child stops sucking breast, looks at mother's hands, sucks own hand through confusion of the two.

c. child sees rattle and hand together and grasps.

111 d. child sees rattle, starts sucking, moves hand toward mouth, sees rattle and hand and grasps.

e. La. is on side, E presents tinfoil (E can't be seen) La. joins hands, eventually sees hand and object together and separates hands and grasps object.

113 f. child loses rattle held in left hand on right side; continually searches for the rattle on his left side.

5. The child grasps what he sees without limitations relating to the position of the hand.

a. child grasps the objects that are presented regardless of hand visibility.

b. child brings before her eyes the objects placed in her hands.

116 c. child looks in right direction when hand is held outside of the visual field.

117 d. coordination of direction of glance with a gesture made outside the visual field; intermediate between stages four and five.

Stage III

159 1. shaking to move dolls.

2. kicking dolls.

3. attach balls to strings on L's hands (slack to eliminate chance); gives rise to a secondary circular reaction. Change from right to left hand.

4. pull watch chain to shake rattle.

164 5. generalize to string attached to rubber doll.

6. grasping objects to swing, shake, rub against bassinet, make noise, etc.

167 7. striking (differentiated from simpler grasping schemata).

186 8. motor recognition evidenced by leg shaking at appearance of appropriate stimulus.

195 9. signals and transitions to indication: mother, main entering room give rise to hungry cry; door opening evokes as sound and smiling

10. paper knife not explored as novelty - assimilated to familiar schemata - suck, rub, grasp, look, foot movements.

11. shaking arm, head, body, strike coverlets - procedures to make interesting spectacles last.

203 12. draw self up by pressing on feet and shoulders then fall-shake bassinet.

Stage IV

A. Coordination of secondary schemata

215 1. case sitting on strings attaching dolls to top of bassinet; schema of pulling strings allows child to grasp case. string has tactile and kinesthetic meaning, not spatial or mechanical meaning and is not viewed as an extension of the object.

218 2. withdrawal of material objects which intervene between the intention and the result - striking person's hand to remove (applying a familiar schema as intermediary.)

220 3. relinquishing an object to grasp another (derives from 2).

B. Application of familiar schemata to new situations.

1. using another person's hand to obtain results.

2. using feet to draw object to hands.

a. intention preceding act.

b. search for suitable means.

c. application to that end of earlier discovered schema.

225 3. dropping object in basin - relinquishing object plus striking one object against another.

C. Signs

1. follows father's whereabouts in the room.

249 2. stops drinking bottle when hears end bubbles.

3. cry at sight of bottle of alcohol (used to clean wounds).

D. Exploration of new objects and phenomena and the derived secondary reaction.

1. grasps, examines, makes noise at, rubs, swings, and sucks cigarette case.

2. wool: looks at, turns, feels, squeezes; derived: ex-
255 ploration results in the discovery of unknown phenomena.

Stage V

A. The tertiary circular reaction

268 1. letting go without interest in the act but in the body in motion; looks at the object for a long time, picks up; varies position of fall.

270 2. child does not perceive the role of gravity.

3. progressive accommodation in the manner of picking things up - no longer requires sitting down, stand without leaning on anything.

272 4. rolling stick.

5. floating, splashing in tub, carrying water in bucket.

B. Discovery of new means by experimentation.

1. The supports

a. box on cushion

283 b. watch on extreme end of one cushion with two cushions before the child with overlapping edges.

c. sitting on coverlet - pulls to obtain duck; foresight - using schema without first attempting direct prehension.

287 d. solid support - box.

290 2. The string (as an extension of the object)

a. brush and string - attach before child, place out of sight.

b. swan and string - too slack to make immediate progress, so child begins to shake the string instead of pulling it, develops this superstitious behavior.

c. watch attached to chain under cushion.

293 d. object on sofa, child on chair across from object holding string to which the object is attached.

3. The stick

a. stick used to obtain objects when in hand

298 b. stick sought for use

4. Other examples

305 a. trying to pull stick and rooster through playpen slats through which they could not pass directly

315 b. standing on tablecloth and trying to pull it

c. contents and containers

317 d. putting little blocks into big ones

e. making a watch chain enter a narrow opening; child considers flexible objects rigid.

Stage VI

333 1. Laurent learns the use of the stick through mental combination

2. Lucienne learns to pull things through playpen slats by mental combination.

337 3. rediscovering an object placed in a matchbox.

4. pushing doll carriage: it is easier to push from the other side than pull backwards.

359 5. learning to stick the sharpened end of a pencil into an ivory plate with holes of that size.

Section II

Outline of the Sensorimotor Period

All page references (in parentheses) are to Piaget (1952) unless otherwise noted.

Stage I: The use of reflexes (0 - 1 mo.)

A. Definition: "The reflex must be conceived as an organized totality whose nature it is to preserve itself by functioning and consequently to function sooner or later for its own sake (repetition) while incorporating into itself objects propituous to thid functioning (generalized assimilation) and discerning situations necessary to certain special modes of its activity, (motor recognition) (38)."

B. Accommodation cannot be dissociated from progressive assimilation inherent in the very use of the reflexes (32).

C. Assimilation of data to hereditarily elaborated reflexes is primary (177).

D. Signs: recognitions and meanings are immanent in the use of the reflex (248).

E. Characteristics: Extreme egocentrism--"...to the newborn child there can only exist awareness of attitudes, of emotions, or of sensations of hunger and of satisfaction (37)." There is no perception independent of these.

Stage II: First acquired and primary circular reactions (1 - 4 mo.)

A. Definitions:

1. First acquired adaptations: nonhereditary adaptations to intentional movements.

2. Circular reaction: The repetition of the cycle which has been actually acquired or is in the process of being acquired (49).

3. Primary circular reaction: "...simple organic movements centered on themselves (with or without intercoordinations) and not destined to maintain a result produced in the external environment; grasps for the sake of grasping, sucking, or looking.

but not yet to swing, rub, or reproduce sounds. Moreover, the subject's acts are one with his action which is simple, the means being confused with the ends (157)."

B. Accommodation: If the structure of reality resists being assimilated, the infant is for the first time able to modify his accommodatory movements a little.

C. Assimilation: Functional use prolongs assimilation reflex.

D. Signs: Signals are acquired by the insertion of a new perceptive element in the familiar scemata.

E. Characteristics

1. Acquisitions characterizing sucking (61)

a. circular reaction--playing with the tongue, systematic thumb sucking.

b. passivity increases

c. coordination of heterogenuous schemata at the time of recognition of the visual signals for sucking.

2. Development of vision

a. generalizing assimilation--looking in general and the different types of visual accommodation in particular are put to use progressively in increasingly varied situations (68).

b. recognitory assimilation: differentiation of the golbal schema (looking for the sake of looking) into the recognition (70).

c. coordinations of heterogeneous schemata

1. coordinations of distance and size: involve visual space (75).

2. qualitative coordinations: relationships of color, light, etc. and sensorimotor relationships.

3. coordinations of vision and hearing.

3. Phonation and hearing--development parallels vision.

4. Prehension (89)

   a. impulsive movements and pure reflex (stage I)

   b. first circular reactions related to hand movements, prior to any actual coordination between prehension and sucking or vision.

   c. coordination between prehension and suc'ing.

   d. prehension as soon as the child simultaneously perceives his hand and the desired object.

   e. child grasps what he sees, without limitations as to position of his hand

Stage III: Secondary circular reactions and procedures to make interesting sights last. (4 - 8 mo.)

A. Definitions: In the secondary circular reaction movements are centered on a result produced in the external environment and the sole aim of the action is to maintain this result; furthermore, it is more complex than the primary circular reaction, the means beginning to be differentiated from the ends, at least after the event.

B. Accommodation: effort to rediscover conditions leading to an interesting results.

C. Assimilation: dominates

   1. reproductive: consolidation of certain motor habits by repetition leading to effects in the surrounding milieu which are of interest to the child (Flavell, 1963, p. 101).

   2. recognitory: child exhibits motor recognition of objects by performing shortened forms of the associated motor schema.

   3. generalization: gives rise to procedures to make interesting sights last.

D. Signs: signal-sign intermediary forming transition between the sign to release action and the sign permitting independent prevision of the act.

E. Characteristics

   1. Precursors of classes and relations form.

   2. Transition: preintelligence to intelligence: not yet intelligence.

a. chance discovery

b. aim is only to reproduce

3. Semi-intentional (Flavell, 1964, p. 108): intentional aspects are post hoc--the interesting sensory event becomes a goal only after the means have been put into effect (i.e., after discovery which is accidental).

Stage IV: The coordination of secondary schemas and their application to new situations (8 - 12 mo.)

A. Definition: secondary circular reactions begin to coordinate with each other to form new behavior totalities which are unquestionably intentional and which can be applied to new situations.

B. Accommodation: intermediary between that of the third and fifth stages; accommodation to objects progresses only in so far as coordination of schemata (reciprocal assimilation) is successful like stage II where assimilation dominates; but it leads to the discovery of new relationships between objects thereby anticipating the fifth stage (241).

C. Assimilation: differentiated from the third stage in being more mobile and therefore more generic (237).

D. Sign: actual sign--prevision of events is independent and connected with object activity.

E. Characteristics

1. first actually intelligent behavior patterns

2. distinguish means and ends from outset of behavior; dissociation of means and ends due to intervening obstacles creates intention and separates the behavior pattern from simple habits.

3. cessation of simple repetition; pattern becomes principle schema with a long series of transitional schemata (211).

4. child learns external relationships (212).

a. concept of object: objects attributed a consisitency independent of the self; child becomes capable of seeking objects which disappear; appearance of object permanence.

b. elaboration of spatial field: objectification; heretofore, space was a function of self.

c. causality: any object can be a source of activity (not just the self).

d. time: sequence of events, not just objects.

e. constancy of form: the perception of the form of an object as seen from the frontal parallel plane regardless of its perspective presentation (Piaget and Inhelder, 1969).

f. organization: internal adaptation explicitly established by complementary regroupings and dissociations.

5. procedures to make interesting spectacles last: schema (means) are either borrowed from preceding interrupted circular reaction or are so familiar or automatic as to make the procedure empty (228).

6. application of familiar schemata to new situations (not the same as generalization): not reflective though; actions are the result of perceived facts or the prolongation of a recent reaction; function: to use earlier schemata.

Stage V: The tertiary circular reaction and the discovery of new means by active experimentation (12 - 18 mo.)

A. Definition: in the tertiary circular reactions the child no longer just repeats movements which have presaged an interesting result, but rather gradates these movements so as to vary slightly the obtained result through the implementation of "experiments in order to see" the essence of which is the pursuit of novelty (267).

B. Accommodation: "Accommodation becomes an end in itself, separate from assimilation, but complementary...henceforth accommodation exists before every true assimilation, and this accommodation is simply set in motion by earlier assimilations without being directly derived from them (277)."

C. Assimilation: The child tries to make all new objects conform to already acquired schemata and this constant effort to assimilate leads to the discovery of properties characterizing certain objects which resist assimilation leading to the need for the child to accommodate himself to novelties.

D. Sign: the prevision aspect of signs is accentuated allowing the child to foresee the properties of objects, thus adapting to the mechanism of tertiary circular reactions (355).

E. Characteristics:

1. distinguish from stage IV

a. formation of new schemata (264) due to experimentation (search for novelty); no longer simple reproduction of fortuitous results.

b. coordination directed by the search for new means.

c. schema modification to the end of studying its nature.

d. accommodation for its own sake; formation of the mechanism of empirical intelligence.

e. detaching object from activity--"experiment in order to see."

2. continuity: new result always a chance discovery; experiment always begins with repetition, then the child varies and gradates his movements (273).

3. representation: does not precede action and does not directly result from it; the child's experience remains immediate and is characterized by naive phenomenalism (324).

4. elaboration of reality (Hunt, 1961, p. 154):

a. Object permanence: objects display an ever growing degree of permanence; the child can account for observed sequential displacement.

b. causality: new level of objectification implied by the existence of imitation; attributes powers to external forces as well as the child himself.

c. time: "becomes an objective sequence of external events (Hunt, 1961, p. 158).

Stage VI: The invention of new means through mental combination (18 - 24 mo.)

A. Definitions:

1. Groping (characteristic of preceding attempts to discover means): trial and error motor learning approach. (341)

2. Invention: spontaneous reorganization of earlier schemata which are accommodated by themselves to the new situation through reciprocal assimilation (348).

3. The difference: speed (internalization); in the latter process the structuring assimilatory activity passes unnoticed (344).

B. Accommodation: accommodation "...as always, (consists) in differentiating the preceding schemata according to the variation of the present situation, but this differentiation, instead of operating through actual groping and cumulative assimilation, results from a

spontaneous assimilation, hence (is) more rapid and operating by means of simply representative attempts (344).

C. Assimilation: "Mental experience is therefore an assimilation functioning by itself and thus becomes partly formal, in contrast to the initial material assimilation (349).

D. Sign: symbolic images: the process of accommodation causes signs to be modelled increasingly on characteristics of things which results in the formation of images. Detachment of signs from immediate action (i.e., mental combination) liberates them from direct perception thereby making them symbolic.

E. Characteristics:

1. systematic intelligence; awareness of relationships results in reasoned prevision.

2. representation: allows reciprocal assimilation to remain internal instead of giving rise to empirical gropings.

3. internalization: of knowledge acquired due to experience.

4. new constructions of reality with mental combination (Hunt, 1961, p. 162).

   a. object permanence through hidden displacement: the child becomes able to find objects which he did not actually see placed in their final hiding places (i.e., objects emptied from containers).

   b. space and imagery: the child can comprehend and adjust to detours and remember relationships between changes in location.

   c. causal reconstruction and foresight: child becomes capable of reconstructing causes in the presence of their effects alone (Hunt, 1961, p. 164).

   d. temporal elaborations: "...the objective time series becomes extended into both the future and the past... (Hunt, 1961, p. 165)."

Section III

The Development of Imitation

All references are to Piaget (1962).

Stage I: Preparation through the reflex

Imitation becomes possible beyond the point at which the simple reflex gives rise to reproductive assimilation through the incorporation of external elements (8). Absence of imitation.

Stage II: Sporadic imitation

Reflex schemata are broadened by the incorporation of certain external elements as a result of exerience into differentiated circular reactions. The model is assimilated and differentiated.

Begin vocal imitation:

1. vocal contagion occurs with familiar interesting sounds.
2. mutual imitation which the child starts
3. sporadic imitation with relative precision of a known sound. (11)

Pseudo - imitation, or imitation through training possible (18).

Prehension: child imitates by assimilating the manual movement without confusing them with or necessarily distinguishing them from his own (16).

Vision: same as prehension.

Stage III: Systematic imitation of sounds already belonging to the infant and movements which he can already make and has seen.

Stages IV and V: Imitation of movements not visible on the body of the subject and imitation of new models.

Stage IV:

Substage I: Imitation of movements already made by the child but which are not visible to him.

Substage II: Beginning of imitation of new visual and auditory models.

Stage V: Systematic imitation of new models including those involving movements invisible to the child.

"Imitation has thus become a kind of systematic accommodation tending to modify the schemas with respect to the object, as distince from the accommodations inherent in the act of intelligence, which, although they too apply the schemas to the object, incorporate the object in a system of varied uses. (61)"

Stage VI: The beginning of representative imitation and further development of imitation.

The child can reproduce new models immediately and can imitate models which are no longer present (deferred imitation).

Concept: abstract thema

Image: concrete symbol

Section IV

The Development of Play

All references are to Piaget (1962)

I. Absence of Play

Stage I: The reflex exercise is not a game, it is real adaptation. Play is the relaxation of adaptation, whereas imitation is hyperadaptation.

II. Practice Play

A. Mere practice: functions merely to reproduce behavior adapted to a useful function but repeated out of the usual context just to exercise the power. No symbols, make-believe, or rules. Characteristic of animal behaviors and of children from stage II to stage V, although it may be used later (e.g., asking questions without caring about the answer.)

Stage II: A schema is never essentially ludic or nonludic and its character as play depends on its context and on its actual functioning. Play appears only as a slight differentiation from adaptive assimilation (91).

Stage III: During the period of secondary circular reactions the differentiation of play and intellectual assimilation becomes more advanced. Almost every secondary circular reaction which begins as a learning experience becomes a game. The child discovers "the pleasure of being the cause."

Stage IV: The coordination of secondary schemas allows their application to new situations which can be continued as a game as was seen in the previous stage. The mobility of the schemas allows the formation of real ludic combinations; mastering behaviors, trying them out. Ritualization, preparation for symbolic games, first appears. At this stage it is the child who imposes the combination forming retual whereas in the practice play stage termed "fortuitous combination" these combinations will be imposed by the external environment (116).

Stage V: The child combines unrelated gestures with no particular aim and then makes them into a ritual or motor game. The combinations are not adapted to the external world. The combinations are new and almost immediately have the character of play.

B. Fortuitous Combinations:

The child no longer uses merely acquired activities but builds up new combinations from ludic beginnings. Begins to form in stage IV. The most usual impetus for these games is contact with a new type of toy.

C. Intentional Combinations:

Practice games whose aim is ludic from the beginning. May develop into symbolic games through the introduction of representational imagination or become socialized and thereby games with rules or to lead to real adaptation and no longer qualify as play.

III. Symbolic Play

Stage VI: The ludic symbol is dissociated from the ritual. There is an increase in mental association and the beginning of pretence or make-believe.

Appendix C

Sample Curriculum Guide Outline

Stage I: birth to 1 month

Goals: 1) stimulate and develop innate sucking reflexes and general coordination

2) provide sensory stimulation

Assessment: 1) Child holds bottle voluntarily --to determine the child's stage

2) Child seeks bottle when lost

3) Practice sucking

4) Sucking substitutes for the nipple

Developmental Activities to strengthen the sucking response and general coordination:

1) Allow the baby to hold the bottle or attempt to do so (obviously not all the time).

2) Let the baby lose the bottle or breast occasionally--this should cause him to search for it. His search efficiancy will gradually improve, as will his general coordination.

3) Provide substitutes for sucking--the infant's hand (at this point he will bring his hand to his mouth only by accident); toys (nontoxic, dull, and not small enough to swallow of course); your own hand; the baby blanket; a pacifier; etc. The ability to reject unwanted substitutes indicates the infant's degree of coordination, and opportunities to do so enhance that coordination. If the object is desired, this situation also provides opportunities for search.

4) Change the baby's position and provide opportunities for search in different positions.

Sensory Stimulation

Feeling: 1) Shift the baby's position

2) Hold and rock the baby (but not constantly--give him time to explore his environment).

Seeing: 1) Shift the baby's position, particularly in the direction of light or darkness since these are the main things he "sees" at this age.

2) Attach a bright toy to each side of the crib. He will not be able to see things hung above him since the newborn's head is usually turned to one side. Irregular shapes will be more attractive and noticeable to the newborn than smooth ones.

Hearing: Talk to the infant and play records in his room, but not all of the time or he will simply learn to ignore the "noise"

Stage II: 1 - 4 mo.

Goals: 1) Provide opportunities for the infant to use his new motor skills to interact with the environment.

2) Provide sensory stimulation.

Assessment: 1) The child follows a match with his eyes in a dimly lit room.

2) Babbling begins

3) Child turns head toward sound

4) Child attempts to suck when placed in the usual feeding position.

Developmental Activities

1) To coordinate senses (vision and hearing) with motor skills: Hold rattle above the infant's face (about 12 inches) and shake it until he looks, then move it in a circle so that he can see it by moving just his eyes (and not his head). Reverse directions. (Gordon, 1970).

2) Developing the object concept:

Hold a toy above the infant's head, move it around within his range of vision until he follows it then move it out of his visual field and cause its subsequent reappearance.

3) Developing imitation:

Give the infant opportunities to imitate you performing some of the movements that you have seen him perform in the past (and therefore know are within his limits).

Sensory Stimulation

Excellent listings of suggestions for environmental enrichment for each stage (age group) are given in G. Painter's Teach Your Baby and will not be repeated here.

One suggestion for this age group is the introduction of new objects which are similar to old ones but which have some striking differences (moderately novel).

Stage III: 4 - 8 mo.

Goals: 1) Help "accidents" happen (see Scope and Sequence III).

2) Provide opportunities to use new skills.

3) Provide sensory stimulation.

Assessment: 1) Loss of objects results in search?

2) Child grasps objects to swing, rub, etc?

3) Child imitates you after you imitate him.

Developmental activities

1) Helping the accidental interesting result happen:

Attach a mobile to crib. When the child is looking at it, bounce your hand on the mattress near his feet making the mobile move. Take one of his feet and bounce it on the mattress again making the objects move. The infant will learn that he can prolong the motion in this way. (Gordon, 1970).

2) Object concept development:

Help the infant lose objects (knock them out of his hand, take from him) so that he can develop search skills.

3) Imitation:

Imitate the infant, especially things like facial expressions which he can't see to help him learn about himself. Also produce speech sounds which you have heard him make so that he can imitate and practice them.

Stage IV: 8 - 12 mo.

Goals: Each stage is to provide opportunities for the child to develop and exhibit the new skills which characterize that stage and which are delineated in the "Scope and Sequence" section of the

curriculum model and to provide sensory stimulation.

Assessment: Assessment for each stage is based on the infant's ability to perform certain tasks requiring stage-relevant skills or an observation of the infant indicating that he is employing the appropriate process and product skills.

Developmental Activities

1) Coordination of two behavior patterns and spatial relations

Place an obstacle between the infant and his desired goal (some favorite toy). If the infant does not voluntarily remove it, demonstrate how to remove the object and what the results are so that he can use his stage IV imitation skills.

2) Object Concept:

Hide desired objects in the baby's sight (Ex: put a toy under a blanket) and let him find them. If he doesn't, try imitation. If this fails, go back to stage III.

3) Coordination of two behavior patterns:

When the infant has an object in each hand offer him another which you think he will prefer. By this procedure the infant should learn to relinquish an object in order to obtain another (let go, grasp combination).

Stage V: 12 - 18 mo.

Developmental Activities

1) Imitation and facilitation of new process skill

Demonstrate the effects of varying procedures by dropping objects and varying the position of fall, etc.

2) Facilitating discovery of new means by experimentation: (causality, spatial realtions)

Place a favorite toy on the edge of a blanket out of the reach of the infant and do not allow him to move toward it. Place the opposite end of the blanket near the child. Let him learn by experimentation how to obtain the object by pulling the blanket. Give him time (days or weeks) and several tries. If nothing happens, try the imitation approach.

3) Object Concept:

Within the child's view hide an object several times in succession (Under a box, a chair, a rug, etc.). Then let him look for it. At stage V he will appropriately look in the last hiding place only.

4) Other situations to promote discovery of new means by experimentation.

a. The use of a stick to draw distant objects near.

b. Using an attached string to draw things near.

c. Placing a flexible watch chain in a small opening.

Stage VI: 18 - 24 mo.

Developmental Activities

1) Develop and employ representation skills:

Place an object in a matchbox and allow the infant to find it.

2) Object Concept:

Invisible displacements--the old shell game (I. Gordon, 1970). Set three containers of different sizes and place a favorite toy under one of them in the child's presence. Move the containers, then ask the child to select the one with the toy under it. He will eventually learn to choose by size and remember what the right answer is. When he is successful place the toy under another container.

3) Place the infant in problem solving situations which will allow him to use his new powers of mental combination.

a. Place the infant in a playpen. Outside the playpen put an interesting toy or object that will have to be turned in a certain way in order to fit between the playpen slats.

b. Simple puzzles and shape-matching games (like the ball with holes of different shapes and pieces that fit in the holes are appropriate to this age group. (Gordon, 1970).

Many other activities are possible for each stage. One excellent source is Ira Gordon's Baby Learning Through Baby Play. (1970). Genevieve Painter (1971) also suggests some additional games. Probably the best source of Piagetian stage relevant activities is Piaget's observations and experiments (see Appendix A, section I).

Since parents will always wish to assess their children and will always fear that they aren't moving fast enough, there are several aspects of Piagetian theory which the home visitation teacher must emphasize in her explanation of the infants development:

1) Age norms are only approximate.

2) Stage order is invariant, not age.

3) Gradual and continuous processes are involved in development and therefore the appearance of a stage IV behavior when the child is supposedly in stage V does not indicate a "relapse" and the occasional appearance of stage V behaviors does not mean that the child is in stage V but rather that he is in transition and moving toward stage V.

4) Inappropriate skills (for a given stage) cannot be taught.

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